

Air Force Institute of Technology

AFIT Scholar

AFIT Documents

1-31-2014

Air Force Institute of Technology Research Report 2013

Office of Research and Sponsored Programs, Graduate School of Engineering and Management,
AFIT

Follow this and additional works at: <https://scholar.afit.edu/docs>



Part of the [Higher Education Commons](#)

Recommended Citation

Office of Research and Sponsored Programs, Graduate School of Engineering and Management, AFIT, "Air Force Institute of Technology Research Report 2013" (2014). *AFIT Documents*. 3.
<https://scholar.afit.edu/docs/3>

This Report is brought to you for free and open access by AFIT Scholar. It has been accepted for inclusion in AFIT Documents by an authorized administrator of AFIT Scholar. For more information, please contact AFIT.ENWL.Repository@us.af.mil.



Air Force Institute of Technology

Research Report 2013

Period of Report: 1 October 2012 to 30 September 2013

Graduate School of Engineering and Management

GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT
AIR FORCE INSTITUTE OF TECHNOLOGY
WRIGHT-PATTERSON AIR FORCE BASE, OHIO

Distribution Statement A.
Approved for Public Release; Distribution Unlimited.

AIR FORCE INSTITUTE OF TECHNOLOGY

Wright-Patterson Air Force Base, Ohio

Reproduction of all or part of this document is authorized.

This report was edited and produced by the Office of Research and Sponsored Programs, Graduate School of Engineering and Management, Air Force Institute of Technology. The Department of Defense, other federal government, and non-government agencies supported the work reported herein but have not reviewed or endorsed the contents of this report.

For additional information, please call or email:

937-255-3633
DSN 785-3633
research@afit.edu

or visit the AFIT website: www.afit.edu



Air Force Institute of Technology Research Report 2013 Foreword

Research programs at the Air Force Institute of Technology (AFIT) are an integral component of our research-based graduate education mission, and provide valuable technical and management experiences that enhance our graduates' performance throughout their careers. To maximize value, AFIT's research efforts are aligned with strategic priorities identified in Air Force and DOD guidance such as OSD's Science and Technology (S&T) Priorities for Fiscal Years 2013-17 Planning Memorandum, the United States Air Force Chief Scientist's report *Technology Horizons, A Vision for Air Force Science and Technology During 2010-2030*, and the *Air Force Science & Technology Strategy 2010*.

AFIT's Advanced Navigation Technology Center, Center for Cyberspace Research, Center for Directed Energy, Center for Operational Analysis, Center for Technical Intelligence Studies and Research, Center for Space Research and Assurance and other research groups serve as focal points for many of our research initiatives.

AFIT has strategic partnerships with the Air Force Research Laboratory, the National Air and Space Intelligence Center, the Air Force Life Cycle Management Center, the United States Transportation Command, and many other organizations and operational communities to maximize the contributions of our research programs to national needs. Our faculty and students also engage in collaborations with researchers at universities throughout the nation to advance the state-of-the-art in a variety of disciplines. AFIT cooperates with commercial enterprises to ensure timely transfer of new technology to US industry through Cooperative Research and Development Agreements (CRADAs) whenever appropriate.

This Research Report is prepared annually to summarize the significant contributions of AFIT; to solicit continued involvement and support from our Air Force, DOD, and other federal partners; and to encourage new sponsors to participate in AFIT's research programs. AFIT welcomes new opportunities to engage in research projects that are of mutual interest to our customers, faculty, and students. Additional information is available at <http://www.afit.edu/en/enr/index.cfm>.

Heidi R. Ries, Ph.D.
Dean for Research
Graduate School of Engineering
and Management



TABLE OF CONTENTS

1. INTRODUCTION	1
1.1. OVERVIEW	1
1.2. THE GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT RESEARCH COLLABORATION.....	1
2. SPECIAL RECOGNITIONS.....	5
2.1. FACULTY FELLOWS	5
2.2. PROFESSIONAL CERTIFICATIONS	7
2.3. RESEARCH AND TEACHING AWARDS	9
2.3.1. FACULTY	9
2.3.2. STUDENTS.....	13
2.3.3. STAFF	16
2.3.4. TEAMS.....	16
3. RESEARCH STATISTICS	17
3.1. RESEARCH AND CONSULTING OUTPUT MEASURES	17
3.2. RESEARCH AND CONSULTING SPONSORSHIP	19
3.3. EXTERNAL SPONSOR FUNDING FOR THE GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT	22
4. SPONSORSHIP OF STUDENT RESEARCH	24
4.1. OFFICE OF THE SECRETARY OF THE AIR FORCE.....	24
4.2. HEADQUARTERS UNITED STATES AIR FORCE.....	24
4.3. AIR COMBAT COMMAND.....	24
4.4. AIR EDUCATION AND TRAINING COMMAND.....	24
4.5. AIR FORCE MATERIEL COMMAND.....	27
4.6. AIR MOBILITY COMMAND	36
4.7. AIR FORCE SPACE COMMAND	37
4.8. AIR FORCE RESERVE COMMAND	37
4.9. USAF FIELD OPERATING AGENCIES/DIRECT REPORTING UNITS.....	37
4.10. DEPARTMENT OF DEFENSE	39
4.11. OTHER FEDERAL AGENCIES	42
4.12. NON-FEDERAL SPONSORS.....	44
5. ACADEMIC DEPARTMENT PUBLICATIONS AND FUNDING INFORMATION	46
5.1. DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS	47
5.2. DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING	65
5.3. DEPARTMENT OF ENGINEERING PHYSICS.....	104
5.4. DEPARTMENT OF MATHEMATICS AND STATISTICS	132
5.5. DEPARTMENT OF OPERATIONAL SCIENCES	144
5.6. DEPARTMENT OF SYSTEMS ENGINEERING AND MANAGEMENT	165
6. RESEARCH CENTER PUBLICATIONS AND FUNDING INFORMATION	187
6.1. ADVANCED NAVIGATION TECHNOLOGY CENTER.....	188
6.2. CENTER FOR CYBERSPACE RESEARCH	194
6.3. CENTER FOR DIRECTED ENERGY	200
6.4. CENTER FOR OPERATIONAL ANALYSIS	205
6.5. CENTER FOR SPACE RESEARCH AND ASSURANCE	215
6.6. CENTER FOR TECHNICAL INTELLIGENCE STUDIES AND RESEARCH.....	218
7. TECHNOLOGY TRANSFER	221
7.1. COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS.....	221
APPENDICES	222
APPENDIX A: POST-DOCTORAL AND OTHER RESEARCH ASSOCIATES' CREDENTIALS	222
APPENDIX B: SELECTED ACRONYM LIST	227
APPENDIX C: INFORMATION FOR OBTAINING A COPY OF A THESIS.....	229

(INTENTIONALLY BLANK)

1. INTRODUCTION

1.1. OVERVIEW

This Research Report presents the FY13 research statistics and contributions of the Graduate School of Engineering and Management (EN) at AFIT. AFIT research interests and faculty expertise cover a broad spectrum of technical areas related to USAF needs, as reflected by the range of topics addressed in the faculty and student publications listed in this report. In most cases, the research work reported herein is directly sponsored by one or more USAF or DOD agencies.

AFIT welcomes the opportunity to conduct research on additional topics of interest to the USAF, DOD, and other federal organizations when adequate manpower and financial resources are available and/or provided by a sponsor. In addition, AFIT provides research collaboration and technology transfer benefits to the public through Cooperative Research and Development Agreements (CRADAs). Interested individuals may discuss ideas for new research collaborations, potential CRADAs, or research proposals with individual faculty using the contact information in this document or via the AFIT Directory at www.afit.edu/directory.

Additional information on the research programs at AFIT may also be found on the research web home page at <http://www.afit.edu/en/enr/>. The Office of Research and Sponsored Programs, Graduate School of Engineering and Management can be reached at 937-255-3633, (DSN 785-3633) or by email: research@afit.edu. The primary points of contact are Dr. Michael J. Caylor, Director of Sponsored Programs, 937-255-3636 x7104, DSN 785-3636 x7104 and Dr. Heidi R. Ries, Dean for Research, 937-255-3636 x4544, DSN 785-3636 x4544.

1.2. THE GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT RESEARCH COLLABORATION

As detailed in the 2012-2013 catalog at <http://www.afit.edu/en/docs/AFIT%20Graduate%20Catalog.pdf>, AFIT offers Master's and Doctoral programs in a variety of disciplines through six departments: the Department of Aeronautics and Astronautics (ENY), the Department of Electrical and Computer Engineering (ENG), the Department of Engineering Physics (ENP), the Department of Mathematics and Statistics (ENC), the Department of Operational Sciences (ENS), and the Department of Systems Engineering and Management (ENV). In all of these disciplines, research is an integral component of graduate education, developing an individual student's skills and providing new knowledge of interest to many.

A brief listing of each department's research areas of emphasis appears below. Please contact the faculty or relevant departmental office for further information, or visit the Graduate School of Engineering and Management departmental websites at <http://www.afit.edu/en/>.

The [Department of Aeronautics and Astronautics](#) invites research topic proposals and collaborative suggestions for the Aeronautical Engineering, Astronautical Engineering, Materials Science, and Space Systems programs. The following list highlights the Department's research specialties:

Aeroelasticity and Design Optimization
Aerospace Structures and Materials
Autonomous Control of UAVs
Compact Combustor Development
Computational Fluid Dynamics
Control of High Performance Aircraft
Dynamic Flight Simulation
Experimental Fluid Dynamics
High Velocity Impact
Impact Dynamics
Inflatable Space Structures

Materials and Structural Analysis
Mechanics of Materials and Structures
Micro Air Vehicles
Non-Linear Dynamics
Reentry Dynamics
Rocket & Space Propulsion
Rotocraft Aeromechanics
Satellite Cluster Dynamics, Navigation, & Control
Spacecraft Dynamics & Control
Turbine Aerodynamics

The [Department of Electrical and Computer Engineering](#) invites research topic proposals and collaborative suggestions for the Electrical Engineering, Computer Engineering, Computer Science, Cyber Operations, and Cyber Warfare programs, as well as the **Advanced Navigation Technology Center** and the **Center for Cyberspace Research**. The following list highlights the Department's research specialties:

Advanced Security-focused Computing Architectures
Artificial Intelligence
Automatic Target Recognition
Communications/Radar
Computer Communication Networks
Cryptography
Cyber Operations and Security
Electromagnetics/Low Observables
Electro-Optics

Evolutionary Algorithms
Guidance, Navigation, and Control
Hardware Assurance
Information Visualization
Micro and Nanosystems
Parallel and Distributed Processing
Signal and Image Processing
Software Protection
Wireless Networks
Wireless Sensor Networks

The [Department of Engineering Physics](#) invites research topic proposals and collaborative suggestions for the Applied Physics, Nuclear Engineering, Optical Sciences and Engineering, Materials Science (jointly operated with the Department of Aeronautics and Astronautics), and Combating Weapons of Mass Destruction programs, as well as the **Center for Directed Energy** and **Center for Technical Intelligence Studies and Research**. The following list highlights the Department's research specialties within these programs:

Adaptive Optics, Aero-Optics and Beam Control
Atmospheric Characterization and Compensation
Atmospheric Effects on Weapons Systems
Aviation Weather Forecasting
Biological Chemical Weapon Technologies
Computational Physics
Defects in Crystalline Solids
Directed Energy Weapons Effectiveness
Effects of Nuclear Weapons
Fallout Analysis
Imaging Science
Lasers and Electro-Optics
Muon Detection
Materials – Bio, Nuclear and Sensor

Modeling and Simulation of Atmospheric Effects
Molecular Reactive Dynamics
Nanomaterials
Nuclear Forensics
Nuclear Survivability
Numerical Weather Prediction
Physics-Based Scene Modeling
Positron Spectrometry
Radiation and Particle Detection
Radiation Effects on Materials and Electronics
Radiation Transport
Remote Sensing and Signature Analysis
Semiconductors
Weather Radar

The [Department of Mathematics and Statistics](#) invites research topic proposals and collaborative suggestions for the following research specialties:

Acoustic Wave Scattering
Bayesian Analysis
Biostatistics
Categorical Data Analysis
Design of Experiments
Electromagnetics
Functional Analysis
Information Fusion

Nonlinear Waves
Numerical Analysis
Optimization
Partial Differential Equations
Rarefield Gas Dynamics
Regression Modeling
Stochastic Processes
Wavelets

The [Department of Operational Sciences](#), as well as its resident **Center for Operational Analysis**, invites research topic proposals and collaborative suggestions within the areas of Operations Research, Logistics, and Supply Chain Management programs. The following list highlights the Department's research specialties:

Advanced Research in Automatic Target Recognition	Layer Network Development
Aeronautical Systems Support	POM Prioritization
Agile Combat Support Prioritization	Robust Decision Making
Force Structure Analysis Tool Development	Science of Test Research Consortium
Insourcing	Supply Chain Management

The [Department of Systems Engineering and Management](#) is a multidisciplinary department offering graduate degrees in seven different majors and conducting research in collaboration with the wide spectrum of programs throughout AFIT. The mission of the department is to provide defense-focused graduate education and engage in interdisciplinary research to achieve integrated solutions to current and future Air Force challenges and enhance the interface between technology and human resources by focusing on systems, processes, and management. The following list highlights the Department's research specialties:

Applied Environmental Sciences	Information Assurance and Security
Computer and Network Security	Infrastructure Asset Management
Construction Management	Knowledge Management
Cost Analysis	Occupational/Environmental Exposures
Cyberlaw and Cyberwar	Organizational Change
Design and Analysis of Experiments	Product Design and Development
Ecological Engineering	Project Management
Facility and Infrastructure Management	Reliability Engineering
Fuels Microbiology	Strategic Decision Support
Geographical Information Science	Structural Health Monitoring
Human Systems Integration	Sustainability and Life Cycle Assessment
Image and Display Science	Systems Engineering

Another avenue for educational and research collaboration with the Graduate School of Engineering and Management is through association with one or more of **AFIT's Research Centers**. A brief listing of each Center's research or educational areas of emphasis appears below. Please contact the Centers directly (see Chapter 6) or visit <http://www.afit.edu/research.cfm> for further information.

The [Advanced Navigation Technology \(ANT\) Center](#) is a forward-looking research center seeking to identify and solve tomorrow's most challenging navigation and autonomous and cooperative control problems by focusing on three research thrusts: autonomous and cooperative systems, non-GPS precision navigation, and robust GPS navigation/NAVWAR.

The [Center for Cyberspace Research \(CCR\)](#) is one of the National Security Agency (NSA) and Department of Homeland Security's designated Centers of Academic Excellence in Information Assurance Education (CAE/IAE). CCR is also a National Science Foundation Cyber Corp institution. CCR's objectives are to provide cutting-edge offensive and defensive research solutions for cyberspace and cyber security applications and produce a cadre of technically educated leaders for the DOD and federal government. The CCR has served as the Air Force's Cyberspace Technical Center of Excellence since 2008.

The [Center for Directed Energy \(CDE\)](#) is dedicated to Air Force and DOD research in high energy lasers (HELs), high power microwaves (HPMs), and their enabling technologies. The Center is an advocate for transitioning these systems to the battlefield through vigorous scientific and engineering research, graduate education programs and diverse consulting activities.

The [Center for Operational Analysis \(COA\)](#) directs defense relevant research and timely technology transfer, providing approaches and solutions to current and future operational and resource issues while developing critical and forward thinking analysts, managers, and leaders.

The [Center for Space Research and Assurance \(CSRA\)](#) is focused on delivering highly-valued resilient, responsive and reliable space capabilities to the DOD and Intelligence Community through executing cutting-edge space technology development, science and space experiments in collaboration with government organizations to meet the challenges of tomorrow by developing the technical space cadre through world-class research and immersive hands-on graduate education.

The [Center for Technical Intelligence Studies and Research \(CTISR\)](#) is focused on Air Force, Department of Defense and the U.S. Intelligence Community (IC)'s scientific, technical and operational activities through graduate research programs. Activities include remote sensing technologies, signature and algorithm development for target detection, clarification, and tracking, and advanced biometrics for force protection. CTISR is also a national resource for educating a new generation of intelligence professionals through the Advanced Geospatial Intelligence (AGI) graduate certificate program.

The **Center of Excellence (COE) for Scientific Test and Analysis Techniques (STAT) in Test & Evaluation (T&E)** is a reach-back T&E capability that provides advice and assistance in the application of scientific test and analysis techniques in the development of Test & Evaluation Master Plans (TEMP). The COE provides value to the PEOs/PMs across the Department of Defense through assistance provided to the Chief Developmental Tester (T&E Program Leads) during the T&E planning, execution and assessment. The COE provides an additional resource of subject matter expertise for the program managers and chief developmental testers of major defense acquisition program (MDAP) and Major Automated Information System (MAIS) during the T&E planning, execution, and assessment process.

2. SPECIAL RECOGNITIONS

2.1. FACULTY FELLOWS

Badiru, Adedeji B., Professor and Head Department of Systems Engineering and Management, Fellow of the Institute of Industrial Engineers, Fellow of the Nigerian Academy of Engineering.

Bridgman, Charles J., Professor Emeritus of Nuclear Engineering, Department of Engineering Physics, Fellow of the American Nuclear Society.

Butts, Jonathan W., Maj, Fellow National Board of Information Security Examiners.

Deckro, Richard F., Professor of Operations Research, Department of Operational Sciences, Fellow of the Military Operations Research Society.

Elrod, William E., Professor Emeritus of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of American Society of Mechanical Engineers International.

Franke, Milton E., Professor Emeritus of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of the American Society of Mechanical Engineers.

Goltz, Mark N., Professor of Engineering and Environmental Management, Department of Systems Engineering and Management, Fellow of the Society of American Military Engineers.

Grimaila, Michael R., Associate Professor of Systems Engineering, Department of Systems Engineering and Management, Fellow of the Information System Security Association.

Hengehold, Robert L., Professor of Physics, Department of Engineering Physics, Fellow of the American Physical Society.

Houpis, Constantine H., Professor Emeritus of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Institute of Electrical and Electronic Engineers.

Mall, Shankar, Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of the American Society of Mechanical Engineers International.

Maybeck, Peter S., Professor Emeritus of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Institute of Electrical and Electronic Engineers.

Pachter, Meir, Distinguished Professor of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Institute of Electrical and Electronic Engineers.

Palazotto, Anthony N., Distinguished Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of American Institute of Aeronautics and Astronautics, Fellow of the American Academy of Mechanics and the American Society of Civil Engineers.

Perram, Glen P., Professor of Physics, Department of Engineering Physics, Fellow of the Directed Energy Professional Society.

Pignatiello, Joseph J., Professor of Operations Research, Department of Operational Sciences, Fellow of the American Society for Quality, Fellow of the Institute of Industrial Engineers.

Polanka, Marc D., Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of the American Society of Mechanical Engineers International.

Raquet, John F., Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Institute of Navigation.

Ruggles-Wrenn, Marina B., Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, Fellow of the American Society of Mechanical Engineers International.

Terzuoli, Andrew J., Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, Fellow of the Electromagnetics Academy (FEMA).

Torvik, Peter J., Professor Emeritus of Aerospace Engineering and Engineering Mechanics, Department of Aeronautics and Astronautics, Fellow of the American Institute of Aeronautics and Astronautics, Life Fellow of American Society of Mechanical Engineers International, Fellow of the Ohio Academy of Science.

2.2. PROFESSIONAL CERTIFICATIONS

Akers, Geoffrey A., Lt Col, APDP Level-III Certification - SPRDE

Badiru, Adedeji B., Certified Project Management Professional (PMP), Leadership Certificate (University of Tennessee Leadership Institute), Professional Engineer (State of Oklahoma)

Baldwin, Rusty O., Certified Information Systems Security Professional (CISSP), Professional Engineer (State of Ohio)

Bunker, David J., APDP Level III Certification – SPRDE, APDP Level II Certification – Program Management, APDP Level I Certification – Test and Evaluation

Butts, Jonathan W., Maj, Certified Information Systems Security Professional (CISSP), EC-Council Certified Ethical Hacker (CEH), Global Information Assurance Certification (GIAC) Security Essentials, National Security Agency Certificate for INFOSEC Professionals, National Security Agency Certificate for Senior Systems Managers

Coutu, Ronald A., Jr., Professional Engineer (State of California)

Dube, Thomas E., Maj, Certified Information Systems Security Professional (CISSP)

Fisher, Kenneth A., Maj, Certified Acquisition Professional, Level 1, Systems Planning, Research, Development and Engineering

Goltz, Mark N., Board Certified Environmental Engineer (American Academy of Environmental Engineers), Professional Engineer (State of Minnesota)

Greendyke, Robert B., Professional Engineer (State of Texas)

Grimaila, Michael R., Certified Information Security Manager (CISM); Information Systems Audit and Control Association (ISACA); Rolling Meadows, IL, Certified Information System Security Professional (CISSP); International Information Systems Security Certification Consortium, Inc. (ISC)²; Vienna, VA

Harmon, Frederick G., Lt Col, Professional Engineer (State of New Hampshire)

Harper, Willie F., Professional Engineer (State of Arizona)

***Houpis, Constantine H.,** Professional Engineer (State of Ohio)

Huscroft, Joseph R., Lt Col, Process Re-engineering Certified, Michael Hammer Corporation.

Johannes, Tay W., Professional Engineer (State of Montana)

Kowash, Benjamin R., Maj, Professional Engineer, Nuclear Engineering (State of Michigan)

Kunz, Donald L., Professional Engineer (Commonwealth of Virginia)

Ladd, Darin A., Lt Col, APDP Level II Certification – Program Management, Six Sigma Green Belt, APDP Level I Certification – Communications-Computer Systems

Marciniak, Michael A., APDP Level II Certification – SPRDE, APDP Level II Certification – Program Management, APDP Level I Certification – Test and Evaluation, Certified Laser Safety Officer (Board of Laser Safety, Orlando, FL)

Mullins, Barry E., Assessing Wireless Networks (GAWN) Certification from the Sys Admin, Audit, Network, Security (SANS) Institute's Global Information Assurance Certification (GIAC) Program, Certified Supervisory Control and Data Acquisition (SCADA) Security Architect (CSSA), Information Assurance Certification Review Board, National Security Agency INFOSEC Assessment Methodology (IAM) Certification, National Security Agency INFOSEC Evaluation Methodology (IEM) Certification, Professional Engineer (State of Colorado)

Overstreet, Robert E., Certified in Transportation and Logistics (CTL) by the American Society of Transportation and Logistics (AST&L)

Palazotto, Anthony N., Professional Engineer (State of Ohio)

Perram, Glen P., Professional Engineer (State of Ohio)

Peterson, Gilbert L., Certified Cyber Forensics Professional

***Quinn, Dennis W.**, Professional Engineer (State of Ohio)

Racz, LeeAnn, Maj, Professional Engineer (State of Colorado), Board Certified Industrial Hygienist

Reeder, Mark F., Professional Engineer (State of Ohio)

Robinson, David J., Lt Col, Certified Information Systems Security Professional (CISSP)

Ruggles-Wrenn, Marina B., ASME Pressure Vessel and Piping Division, Certificate of Recognition.

Rutledge, James L., Maj, Professional Engineer (State of Texas)

Ryan, Erin T., Maj, Senior (Level 3) Space Professional

Shelley, Michael L., Certified Air Force Hearing Conservationist

Silvius, Mark D., Maj, APDP Level III Certification – SPRDE-SE, Professional Engineer (State of Delaware)

Tuttle, Ronald F., APDP Level III Certification – Program Management, APDP Level III Certification – SPRDE

Walli, Karl C., Lt Col, APDP Level III Certification – SPRDE, Space Professional Level III Certification, NRO Program Management Level III Certification

Weidner, John W., LTC, Professional Engineer (State of Wisconsin)

Wirthlin, Joseph R., Lt Col, Certified Systems Engineering Professional (CSEP), APDP Level III Certification – SPRDTE, NRO Systems Engineering Level III Certification, APDP Level II Certification – Program Management, AFSSO21 Green Belt

Yamamoto, Dirk P., Lt Col, Board Certified Industrial Hygienist, Diplomate-American Academy of Industrial Hygienists, Professional Engineer (State of Minnesota), Board Certified Safety Professional

*Emeritus faculty

2.3. RESEARCH AND TEACHING AWARDS

2.3.1. FACULTY

ACEBAL, ARIEL O., Lt Col

2013 Air Education and Training Command Winner, Air Force Science, Technology, Engineering, and Math Awards, Outstanding Engineer, Senior Military category.

Recognized as an Ohio Magazine “Excellence in Education” Honoree, Nov 2013.

AHNER, DARRYL K.

AFIT Team of the Quarter (along with AFIT/LS) for development and delivery of T & E short courses.

AKERS, BENJAMIN F.

ENC Instructor of the Quarter, 2013 Spring Quarter.

SOCHE Faculty Excellence in Teaching Award (Nov, 2012).

BAUER, KENNETH W., Jr.

Elevated to Senior Member of IEEE.

BUTTS, JONATHAN W., Maj

2013 Air Education and Training Command Winner, Air Force Science, Technology, Engineering, and Math Awards, Outstanding Scientist, Mid-Career Military category.

COLLINS, PETER J.

2013 Air Force Harold Brown Award for Research.

COUTU, RONALD A., Jr.

Sandia National Laboratory University Alliance 2013 MEMS Design Competition – Honorable Mention Award: Educational Design Category.

AETC nominee for USAF-level 2013 John L. McLucas Basic Research Award.

Eta Kappa Nu (HKN), 2012 Outstanding Teaching Award, ENG Faculty Instructor of the Year.

DEA, JOHN R., Lt Col

ENC Instructor of the Quarter, 2013 Winter Quarter.

DUBE, THOMAS E., Maj

AETC Air Force Research and Development Award, Apr 2013.

Air Force Research and Development Award, Sep 2013.

FIORINO, STEVEN T.

2013 Air Education and Training Command Winner, Air Force Science, Technology, Engineering, and Math Awards, Outstanding Engineer, Mid-Career Civilian category.

FISHER, KENNETH A., Lt Col

Best paper award at GNSS 2012.

CY12 Graduate School Annual Award Winner, Field Grade Officer (FGO).

GEFFRE, JENNIFER L., Maj

Western Decision Science Institute Conference—Best Student Paper Award (#1/11), Mar 2013.

Military Operations Research—81.1 Virtual Symposium—Most Recommended Presentation (one of three out of 61 presentations), Jun 2013.

GROSS, KEVIN C.

2013 Air Education and Training Command Winner, Air Force Science, Technology, Engineering, and Math Awards, Outstanding Engineer, Junior Civilian category.

HARPER, WILLIE F., Jr.

2013 Department Faculty Scholar of the Year Award.

Fulbright Scholar Award.

HAVRILLA, MICHAEL J.

2013 Air Education and Training Command Winner, Air Force Science, Technology, Engineering, and Math Awards, Engineering Achievement Award.

HYDE IV, MILO W., Maj

Elevated to IEEE Senior Member.

Military Officers Association of America Outstanding Military Faculty Award.

JACKSON, JULIE A.

2012 EN Annual Award winner, Civilian Category 3.

ENG Nominee for Civilian Category 3 AFIT Quarterly Award (Third Quarter CY12).

1/28 international participants selected to attend the first-ever IEEE Women's Workshop in Communications and Signal Processing, Banff Canada, 2012.

Inducted to Eta Kappa Nu (HKN), Electrical Engineering Honor Society, Feb 2013.

JOHANNES, TAY W., Lt Col

2013 Sigma Iota Epsilon Honor Society Local Chapter Instructor Award for Outstanding Contributions to the Understanding of Management Sciences.

LANGHALS, BRENT T., Lt Col

2013 Department Educator of the Year Award.

MCHALE, STEPHEN R., LTC

Dr. Leslie M. Norton Award, AFIT Student Association, AFIT Spring 2013 Graduation Ceremony.

MILLER, MICHAEL E.

2013 Department Outreach Service of the Year Award.

MILLS, ROBERT F.

ENG Civ Cat III, 1st Quarter 2013 Graduate School Award Winner.

OGDEN, JEFFREY A.

2013 Professor of the Year Award – AFIT/ASAM.

PERRAM, GLEN P.

2013 Air Education and Training Command Winner, Air Force Science, Technology, Engineering, and Math Awards, Outstanding Engineer, Senior Civilian category.

2013 Air Force Winner, Science, Technology, Engineering, and Math Awards, Outstanding Engineer, Senior Civilian category.

PETERSON, JESSE D., Capt

ENC Instructor of the Quarter, 2013 Summer Quarter.

POCHET, MICHAEL C., Maj

SOCHE Faculty Excellence in Teaching Award (2012).

POLANKA, MARC D.

SOCHE Faculty Excellence in Teaching Award (2012).

RACZ, LEEANN, Maj

2013 Department Researcher of the Year Award.

SOCHE Faculty Excellence in Teaching Award (2012).

Best Poster Award. Racz, L., Walters, E., Schuldt, S., Janeczko, A., Magnuson, M., Willison, S. Fate of chemical warfare agents in wastewater treatment biomass (Poster), CBRNe Convergence 2012, Norfolk, VA, 30 Oct-2 Nov 2012.

RAQUET, JOHN F.

Institute of Navigation (ION) Distinguished Service Award, for “Visionary Leadership of the Satellite Division of the ION,” (2012).

AETC nominee for the 2012 Air Force Science, Technology, Engineering, and Mathematics Awards, Air Force Outstanding Engineer, Senior Civilian.

Recognized by the Affiliate Societies Council of Dayton as an outstanding engineer and scientist as part of Engineers and Scientists Week (2012).

REEDER, MARK F.

Letter of commendation from AFRL/RB for work in the Trisonic Gas Facility (Dec 2011).

RITSCHER, JONATHAN D., Lt Col

2013 Department Teacher of the Year Award.

RUGGLES-WRENN, MARINA B.

2012 Best Technical Paper Award – ASME International Gas Turbine Institute, 2012 Turbo Expo Technical Conference. Presented Jun 2013.

STRAKOS, JOSHUA K., Maj

University of Houston Bauer College of Business, Dean's Award for Academic Excellence, 2013.

TERZUOLI, ANDREW J.

Annual Citation from IEEE—local joint chapter chair.

WIRTHLIN, JOSEPH R., Lt Col

2013 Shingo Research Award for the "Guide to Lean Enablers for Managing Engineering Programs."

YAMAMOTO, DIRK P., Lt Col

2013 Department Journal Publication of the Year.

2.3.2. STUDENTS

ACERSON, BRIAN M.

2013 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Electrical and Computer Engineering. Thesis title: "Simulation and Fabrication of Mathematically Designed Electromagnetic Structures."

ADOMANIS, BRYAN M.

International Society for Optics and Photonics (SPIE) Thesis Award, AFIT Spring 2013 Graduation Ceremony.

BURNS, AARON J.

2013 Semi-finalist for the Innovative Applications in Analytics Award presented at INFORMS.

CLEAVER, TIMOTHY A.

2013 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Aeronautics and Astronautics. Thesis title: "Aerodynamic Characterization of an Air-to-Air Missile with Computational Fluid Dynamics."

2013 Chancellor's Award for the most exceptional master's thesis by a graduating student in the Department of Aeronautics and Astronautics. Thesis title: "Aerodynamic Characterization of an Air-to-Air Missile with Computational Fluid Dynamics."

COOKE, DAVID J.

2013 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Mathematics and Statistics. Thesis title: "A Discrete X-Ray Transform for Chromotomographic Hyperspectral Imaging."

CHUN, WOO-SUK

Chun, W., P.P. Feng, A.E. Thal., Jr., and A.B. Badiru, "Life-Cycle Assessment of LEED vs. Conventionally Constructed Residential Units," Industrial and System Engineering Research Conference, San Juan, Puerto Rico, May 18-22, 2013. Finalist for Best Paper Award in Engineering Management Track.

FORD, MICHAEL A.

American Nuclear Society Thesis Award, AFIT Spring 2013 Graduation Ceremony.

Ivan D. Thompson Award, AFIT Student Association, AFIT Spring 2013 Graduation Ceremony.

HAFICH, MICAH J.

2013 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Operational Sciences. Thesis title: "A Mixed Integer Programming Model for Improving Theater Distribution Force Flow Analysis."

HARLEY, JACOB L.

Best Paper Award, co-author "Imaging Fourier-Transform Spectrometry for Plume Diagnostics and Code Validation," 9th International Symposium on Special Topics in Chemical Propulsion, Quebec City, Canada, 13-16 May 2013.

JANECZKO, ALLEN K.

Racz, L., Walters, E., Schuldt, S., Janeczko, A., Magnuson, M., Willison, S. Fate of chemical warfare agents in wastewater treatment biomass (Poster), CBRNe Convergence 2012, Norfolk, VA, 30 Oct-2 Nov 2012. Won "Best Poster" Award.

KEITH, STEPHANIE R.

Measurement and Signals Intelligence (MASINT) Committee Award, AFIT Spring 2013 Graduation Ceremony.

LYNES, DAVID D.

2013 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Engineering Physics. Thesis title: "An Analysis of Methods to Determine Nuclear Weapon Yield Using Digital Fireball Films."

MCKENNA, REBEKAH S.

2013 Semi-finalist for the Innovative Applications in Analytics Award presented at INFORMS.

MORRILL, DANA F.

Military Operations Research Society (MORS) Dr. James T. Moore Graduate Research Prize.

PARR, JEFFREY C.

2013 Outstanding Engineer/Scientist by the Wright Brothers Chapter of the SAFE Association.

RHOBY, MICHAEL R.

Best Paper Award, co-author "Imaging Fourier-Transform Spectrometry for Plume Diagnostics and Code Validation," 9th International Symposium on Special Topics in Chemical Propulsion, Quebec City, Canada, 13-16 May 2013.

RUSSI, JASON

2013 Department Student Scholar of the Year Award for "3-D Display Project."

2013 Dean's Award for the most exceptional master's thesis by a graduating student in the Department of Systems Engineering and Management. Thesis title: "Effects of Stereoscopic 3D Digital Radar Displays on Air Traffic Controller Performance."

SANTANA, LAURIENNE

2013 Department Student Scholar of the Year Award for "3-D Display Project."

SCHERRER, ELIZABETH M.

Lt Edwin E. Aldrin, Sr. Award, AFIT Spring 2013 Graduation Ceremony.

SCHULDT, STEVEN J.

Racz, L., Walters, E., Schuldt, S., Janeczko, A., Magnuson, M., Willison, S. Fate of chemical warfare agents in wastewater treatment biomass (Poster), CBRNe Convergence 2012, Norfolk, VA, 30 Oct - 2 Nov 2012. Won "Best Poster" Award.

SPLAWN, JOSHUA

2013 Southern Ohio Chapter of the Human Factors and Ergonomics Society Best Student Paper Award for
“Prediction of Perceived Workload from Task Performance and Heart Rate Measures.”

THOMPSON, DAVID M.

International Society of Logistics (SOLE) Jerome G. Peppers, Jr., CLP Outstanding Student Award.

URIBE, DANIEL

2013 AFIT Systems Engineering Award.

Uribe, D., Miller, M.E., and Smith, S. (2013). An analysis of the vestibulo-ocular reflex during vibration,
Proceedings of the International Symposium on Aviation Psychology, Dayton, OH, Vol. 4, pp. 506-511.
Selected Finalist Best Student Paper.

WALTERS, EDWARD

Racz, L., Walters, E., Schuldt, S., Janeczko, A., Magnuson, M., Willison, S. Fate of chemical warfare agents in
wastewater treatment biomass (Poster), CBRNe Convergence 2012, Norfolk, VA, 30 Oct-2 Nov 2012. Won
“Best Poster” Award.

2.3.3. STAFF

FREVERT, CARLOS J., MSgt

Outstanding Cyberspace Systems (3D1XX) SNCO: AETC FY13 Information Dominance Annual Awards.

2.3.4. TEAMS

ADVANCED NAVIGATION TECHNOLOGY CENTER

2013 Science, Technology, Engineering, and Mathematics (STEM) Award, AF Exploratory or Advanced Technology Development Award.

CENTER FOR CYBERSPACE RESEARCH

Outstanding Information Assurance Element: AETC FY13 Information Dominance Annual Awards.

2013 Science, Technology, Engineering, and Mathematics (STEM) Award, AF Outstanding Engineer, Team.

2013 Science, Technology, Engineering, and Mathematics (STEM) Award, AF Research Management.

3. RESEARCH STATISTICS

3.1. RESEARCH AND CONSULTING OUTPUT MEASURES

There are measurable indicators of AFIT's contribution to the engineering and scientific community and AFIT's success in staying well informed of technical possibilities and scientific opportunities. These indicators include the number and quality of technical publications accepted by the editors of journals; the number of presentations accepted for regional, national and international conferences; the number of sponsor funded research projects conducted; and finally, the number of student Graduate Research Papers, MS theses, and PhD dissertations completed and submitted to the Defense Technical Information Center. For FY13, these output measures are shown in Tables 3.1a and 3.1b for the Departments and Centers, respectively.

Table 3.1a Faculty Research and Sponsored Programs Output, by Department

	Graduate School, by Department						
	Graduate School (EN) Total	Math & Stats (ENC)	Electrical & Comp Eng (ENG)	Engineering Physics (ENP)	Operational Sciences (ENS)	Sys Eng & Management (ENV)	Aeronautics & Astro (ENY)
Number of Faculty (FTE)*	137	17	34	21	24	22	19
Refereed Publication Authorships***	237	22	44	71	35	35	30
Refereed Conferences on the Basis of Full Paper Review***	140	7	59	17	24	23	10
Refereed Conferences on the Basis of Abstract Review***	139	3	44	30	10	29	23
Sponsor Funded Projects**	198	8	61	44	14	15	54
Books & Chapters of Books***	16	-	8	-	-	8	-
Patents	9	-	4	2	-	3	-
Doctoral Dissertations Advised	31	3	14	8	1	-	5
Master's Theses Advised	211	6	57	37	22	47	42
Graduate Research Papers Advised	31	-	2	-	23	6	-

*FTE: Full-time equivalent

**One project associated with the Office of Research and Sponsored Programs (ENR) and one project associated with the Academic Affairs Office (ENW) are reflected in Graduate School (EN) Total

***Publications/Presentations are counted by faculty authorships

Table 3.1b Faculty Research and Sponsored Programs Output, by Center

	Graduate School, by Center						
	Center Total	ANT	CCR	CDE	COA	CSRA	CTISR
Number of Affiliated Faculty*	103	21	15	10	22	21	14
Refereed Publication Authorships**	81	3	17	21	32	5	3
Refereed Conferences on the Basis of Full Paper Review**	57	8	27	-	22	-	-
Refereed Conferences on the Basis of Abstract Review**	47	11	2	11	8	6	9
Sponsor Funded Projects	89	23	12	23	14	11	6
Books & Chapters of Books**	8	7	1	-	-	-	-
Patents	3	1	2	-	-	-	-
Doctoral Dissertations Advised	17	3	7	5	1	-	1
Master's Theses Advised	73	14	12	6	20	16	5
Graduate Research Papers Advised	25	-	2	-	23	-	-

*Some faculty are affiliated with multiple centers.

**Publications/Presentations are counted by faculty authorships.

3.2. RESEARCH AND CONSULTING SPONSORSHIP

As part of an Air Force institution, the faculty members of the Air Force Institute of Technology focus their research on current problems as well as future systems of the Air Force and other DOD organizations. Evidence of this focus is that 94% of all theses, dissertations, and graduate research papers listed in Table 3.1a are externally sponsored by Air Force, DOD and government agencies. In addition, most of the research projects and consultations are carried out for Air Force and DOD units. The data are summarized in Figure 3.1 and Table 3.2.

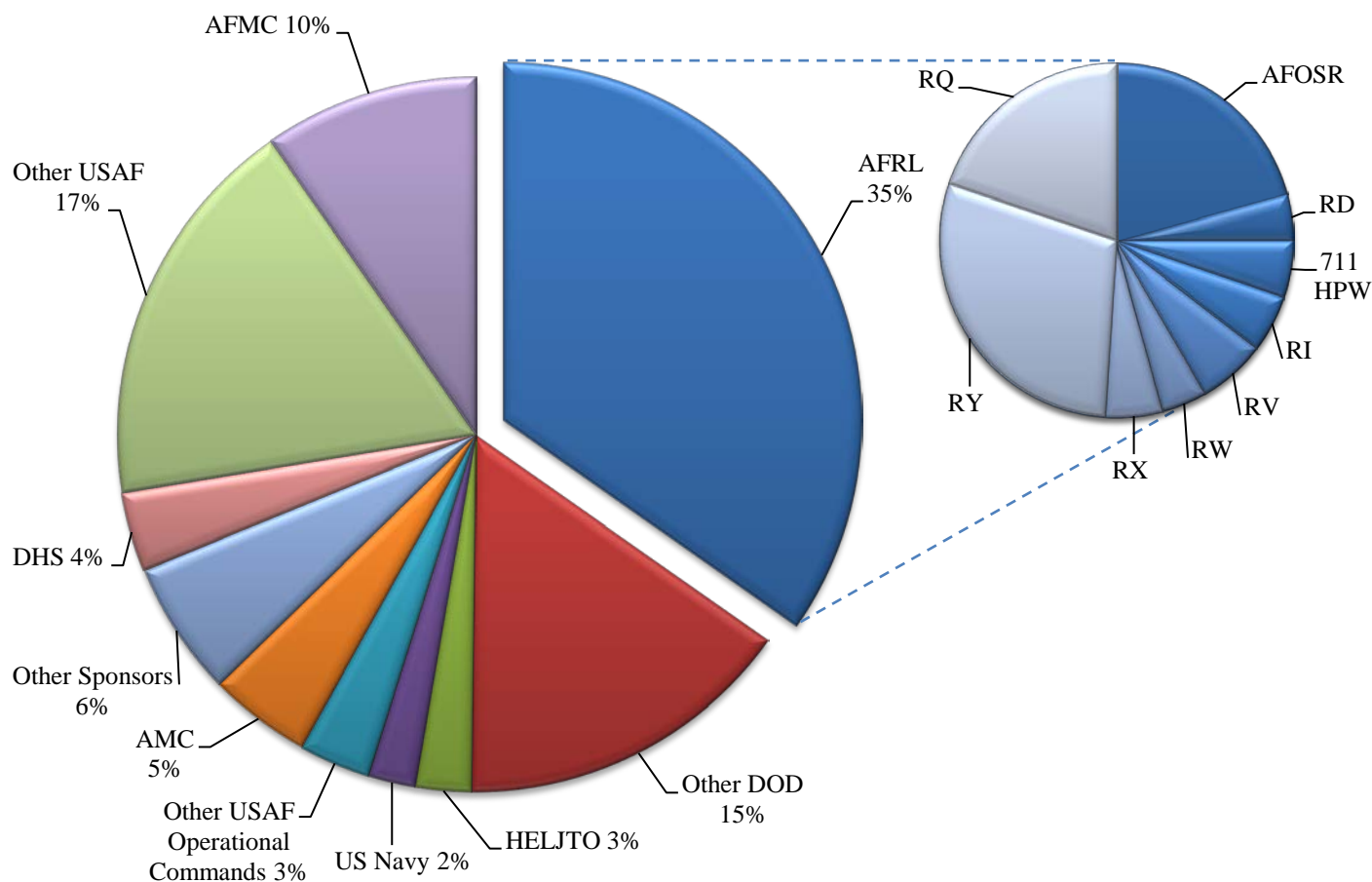


Figure 3.1 Sponsors of AFIT Theses, Dissertations, and Graduate Research

Table 3.2 AFIT External Sponsorship by Organization

SPONSOR ORGANIZATION	PhD Dissertations	Master's Theses	Graduate Research Papers	Funded Projects
OFFICE OF THE SECRETARY OF THE AIR FORCE	1	1		1
HQ UNITED STATES AIR FORCE		2		1
AIR COMBAT COMMAND		2		1
AIR FORCE MATERIEL COMMAND		8	2	4
Air Force Life Cycle Management Center		2	2	2
Air Force Nuclear Weapons Center		8		1
Air Force Research Laboratory (AFRL)				1
711 Human Performance Wing (RH)		5		2
Air Force Office of Scientific Research (AFOSR)	4	16		37
Aerospace Systems Directorate (RQ)	4	16		11
Directed Energy Directorate (RD)	1	3		2
Information Directorate (RI)	1	4		
Materials & Manufacturing Directorate (RX)		5		6
Munitions Directorate (RW)		4		9
Sensors Directorate (RY)	6	21	1	22
Space Vehicles Directorate (RV)		6		3
Air Force Seek Eagle Office		1		
Air Force Sustainment Center		1	1	
Air Force Test Pilot School		1		1
AIR MOBILITY COMMAND		2	11	
AIR FORCE SPACE COMMAND		3	1	1
Space and Missile Systems Center		3		1
AIR FORCE RESERVE COMMAND			1	
USAF FIELD OPERATING AGENCIES/DIRECT REPORTING UNITS				
Air Force Civil Engineer Center		4		
Air Force Manpower Agency			1	
Air Force Medical Logistics Office		1		
Air Force Medical Support Agency		2		4
Air Force Personnel Center		1		
Air Force Technical Application Center	1	2		
Air Force Weather Agency		3		
National Air and Space Intelligence Center	1	2		5
US Air Force Academy	1	1		
OTHER DEPARTMENT OF DEFENSE	4	18		18
Defense Advanced Research Projects Agency		1		3
Defense Threat Reduction Agency		4		6
High Energy Laser Joint Technology Office	3	4		10
Laboratory for Telecommunications Sciences				1
Missile Defense Agency				3
National Geospatial-Intelligence Agency				1
National Security Agency				3
Office of the Secretary of Defense		5		8
Operationally Responsive Space Office		2		
United States Army	1	1		3
United States Navy		3	3	1
US European Command			1	
US Pacific Command		1		
US Special Operations Command		1		
US Strategic Command				3
US Transportation Command		3	1	1

*NOTE: Some student publications have multiple sponsors; See App B for Selected Acronym List

OTHER FEDERAL AGENCIES				
Department of Energy				4
Department of Health and Human Services				1
Department of Homeland Security		10		2
Environmental Protection Agency		2		1
Federal Aviation Administration		1		
National Aeronautics and Space Administration		2		
National Science Foundation	1	1		5
NON-FEDERAL AGENCIES				
American Society for Engineering Education		1		
Brazilian Air Force		1		
College of Performance Management		1		
Dayton Area Graduate Studies Institute	1			3
Global Velocity		1		
Locata				1
Lockheed Martin		2		1
Aerovar Research, LLC				1
Ministry of Defence, Singapore		1		
MZA Associates				1
Spectral Energies, LLC				1
the Optical Science Company				1
Turkish Air Force		1		
Utah State University		1		
*TOTALS	30	198	25	198

3.3. EXTERNAL SPONSOR FUNDING FOR THE GRADUATE SCHOOL OF ENGINEERING AND MANAGEMENT

Many of the Graduate School of Engineering and Management's theses and research projects completed under faculty supervision (sponsored or unsponsored) are funded in part by other Air Force, DOD and government units and agencies. Often, this funding results from collaboration between faculty and thesis sponsors and occurs when the research project can be leveraged by the purchase of equipment or services not otherwise available. Tables 3.3 and 3.4, and Figure 3.3, summarize external funding for FY13, and Figure 3.2 summarizes the past ten fiscal years of sponsored funding.

Table 3.3 FY13 External Funding & Research Expenditures for Academic Departments & Research Centers (\$1,000's)

Department	Newly Awarded Research Projects		Newly Awarded Education Projects		Total FY13 Newly Awarded Projects		Total FY13 Research Expenditures
	#	\$k	#	\$k	#	\$k	\$k
Mathematics & Statistics (ENC)	8	362	-	-	8	362	475
Electrical & Computer Eng (ENG)	57	4,463	4	856	61	5,319	6,096
Engineering Physics (ENP)	43	4,911	1	28	44	4,939	5,846
Research & Sponsored Programs (ENR)	1	16	-	-	1	16	-
Operational Sciences (ENS)	13	2,713	1	90	14	2,803	5,782
Systems Eng & Management (ENV)	15	567	-	-	15	567	1,435
Academic Affairs (ENW)	-	-	1	5	1	5	-
Aeronautical & Astronautical Eng (ENY)	52	2,370	2	30	54	2,400	5,801
TOTAL	189	15,402	9	1,009	198	16,411	25,435

Center							
Advanced Navigation Technology (ANT)	23	1,402	-	-	23	1,402	1,732
Center for Cyberspace Research (CCR)	8	1,371	4	829	12	2,200	1,640
Center for Directed Energy (CDE)	23	2,448	-	-	23	2,448	2,273
Center for Operational Analysis (COA)	13	2,713	1	90	14	2,803	5,741
Center for Space Research and Assurance (CSRA)	11	1,031	-	-	11	1,031	2,827
Center for Tech Intel Studies & Research (CTISR)	6	1,257	-	-	6	1,257	1,173
TOTAL	84	10,222	5	919	89	11,141	15,386

Notes: Total research expenditures reported include institutional cost sharing, which is not included in newly awarded projects. Numbers reported to the ASEE and NSF research expenditure surveys vary somewhat due to differences in definitions. All Center funds are also included in departmental funding.

Figure 3.2 New Award History FY04-FY13

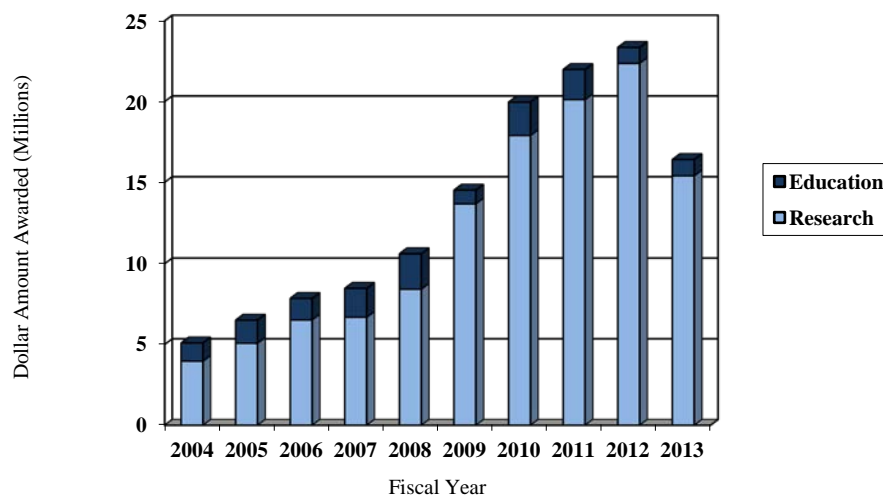
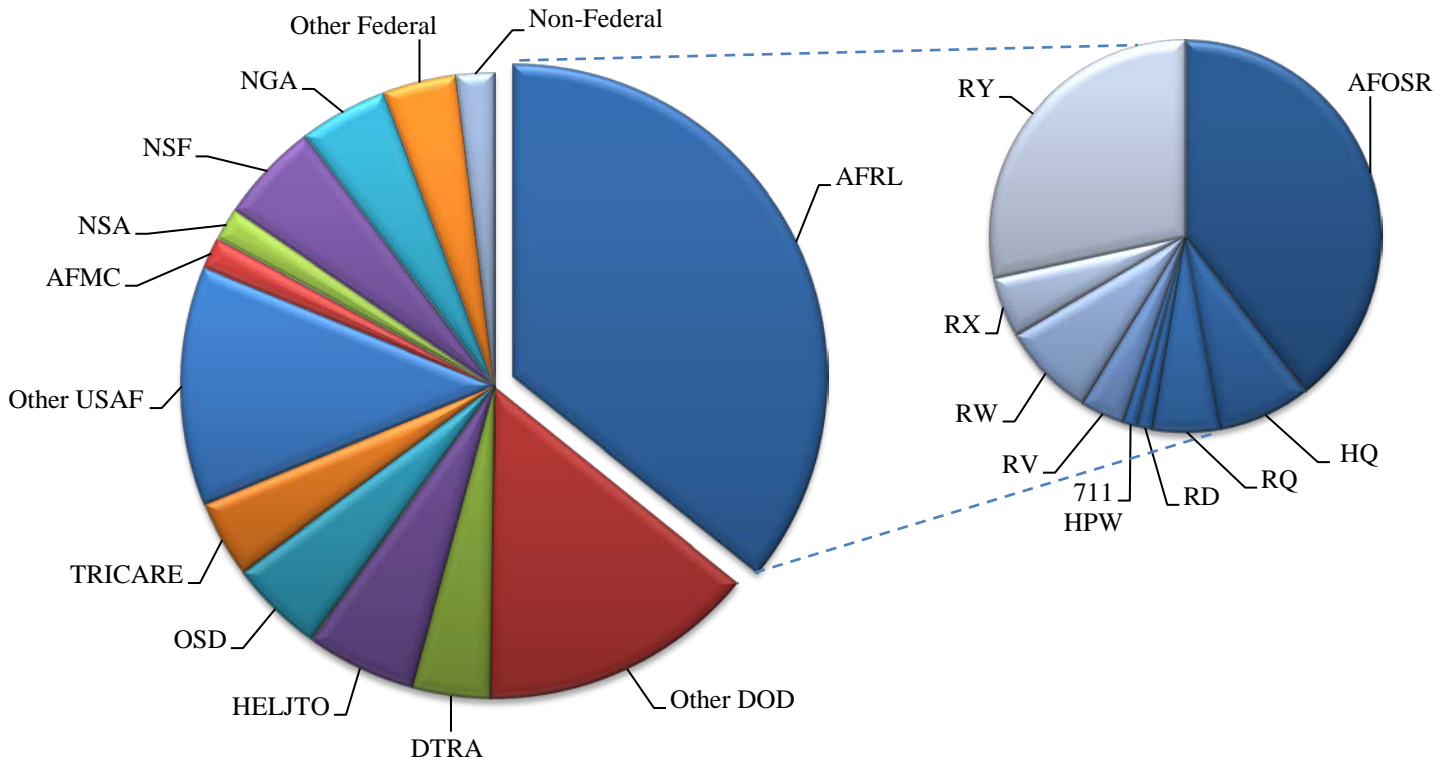


Figure 3.3 New FY13 Awards by Sponsor



*Pie Chart on the right shows breakdown by AFRL Technology Directorates

Table 3.4 New FY13 Awards to Academic Departments & Research Centers by Sponsor

Dept.	AFRL \$k	AFMC (Non-AFRL) \$k	Other USAF \$k	Other DOD \$k	NSF \$k	Other Federal \$k	Non- Federal \$k	Total \$k
ENC	249	-	-	-	83	30	-	362
ENG	2,190	-	396	1,521	769	270	173	5,319
ENP	1,676	-	303	2,700	-	200	60	4,939
ENR	16	-	-	-	-	-	-	16
ENS	550	264	980	1,009	-	-	-	2,803
ENV	72	-	152	220	-	123	-	567
ENW	-	-	-	-	5	-	-	5
ENY	1,127	-	197	989	-	-	87	2,400
TOTAL	5,880	264	2,028	6,439	857	623	320	16,411

Note: "Other DOD" in this table includes the DTRA, HELJTO, NGA, NSA, OSD, and TRICARE pie slices from Figure 3.3, plus funding from other DOD organizations.

**Research
Center**

ANT	1,132	-	50	150	-	-	70	1,402
CCR	50	-	-	1,138	742	270	-	2,200
CDE	1,333	-	-	952	-	-	163	2,448
COA	550	264	980	1,009	-	-	-	2,803
CSRA	205	-	135	691	-	-	-	1,031
CTISR	-	-	163	1,069	-	25	-	1,257
TOTAL	3,270	264	1,328	5,009	742	295	233	11,141

Note: All Center funds are also included in departmental funding.

4. SPONSORSHIP OF STUDENT RESEARCH

4.1. OFFICE OF THE SECRETARY OF THE AIR FORCE

DOCTORAL DISSERTATIONS

HARTMAN, PAUL L., *The Outsourcing-to-Insourcing Relocation Shift: A Response of U.S. Manufacturers to the Outsourcing Paradigm*. AFIT/ENS/DS/13J-18. Faculty Advisor: Dr. Jeffrey A. Ogden. Sponsor: SAF. [COA]

MASTER'S THESES

GUSTAFSON, TREVOR A., *FIST and the Analytical Hierarchy Process: Comparative Modeling*. AFIT/ENV/13M-08. Faculty Advisor: Lt Col Joseph R. Wirthlin. Sponsor: SAF.

4.2. HEADQUARTERS UNITED STATES AIR FORCE

MASTER'S THESES

ROBERTS, MATTHEW D., *An Empirical Investigation of USAF Logistics Readiness Officer Mission Sets*. AFIT/ENS/13M-19. Faculty Advisor: Maj Christian E. Randall. Sponsor: HQ USAF/A4. [COA]

THOMPSON, DAVID M., *USAF Aircraft Maintenance Officer Knowledge, Skills and Abilities and Commonalities among the Logistics Officer Corps*. AFIT/ENS/13M-22. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: HQ USAF/A4. [COA]

4.3. AIR COMBAT COMMAND

MASTER'S THESES

FINKE, CINDY D., *Format Preserving Encryption: Evaluating FFX for Use Within the NextGen Air Traffic Control System*. AFIT/ENG/13M-17. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: ACC/AFNORTH.

MEENTS, JOSHUA B., *Control Variates and Optimal Designs in Metamodeling*. AFIT/ENS/13M-11. Faculty Advisor: Dr. Mark A. Friend. Sponsor: ACC/53 TMG. [COA]

4.4. AIR EDUCATION AND TRAINING COMMAND

AIR FORCE INSTITUTE OF TECHNOLOGY

DOCTORAL DISSERTATIONS

GUTMAN, ALEX J., *Construction, Analysis, and Data-Driven Augmentation of Supersaturated Designs*. AFIT/ENC/DS/13S-02. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

KIMBALL, WILLIAM B., *A Formal Approach to Vulnerability Discovery in Binary Programs*. AFIT/ENG/DS/13J-03. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: N/A. [CCR]

KING, AMANDA S., *Development of a Model and Localization Algorithm for Received Signal Strength-Based Geolocation*. AFIT/ENG/DS/13J-02. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [ANT]

MONTMINY, DAVID P., *Enhancing Electromagnetic Side-Channel Analysis in an Operational Environment*. AFIT/ENG/DS/13S-01. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: N/A. [CCR]

SEAL, MICHAEL D., *Directional Thermal Emission and Absorption from Surface Microstructures in Metalized Plastics*. AFIT/ENP/DS/13S-03. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: N/A. [CDE]

VAP, JASON C., *Design and Characterization of Optical Metamaterials Using Tunable Polarimetric Scatterometry*. AFIT/ENP/DS/12-03. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: N/A. [CDE]

MASTER'S THESES

ACERSON, BRIAN S., *Simulation and Fabrication of Mathematically Designed Electromagnetic Structures*. AFIT/ENG/13M-01. Faculty Advisor: Dr. Peter J. Collins. Sponsor: N/A.

ALEJANDRO, EARL B., *Space Debris Mitigation CONOPS Development*. AFIT/ENV/13J-04DL. Faculty Advisor: Lt Col Brent T. Langhals. Sponsor: N/A.

BAKER, PETER A., *Development of Peptide Nanotube-Modified Biosensors for Gas-Phase Organophosphate Detection*. AFIT/ENV/13M-35. Faculty Advisor: Dr. Mark N. Goltz. Sponsor: N/A.

BIRGE, CHRISTOPHER A., *Hardware Design, Integration, and Test for the ALICE CubeSat Mission*. AFIT/ENY/13M-01. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: N/A. [CSRA]

BLUNCK, KACEY E., *Space Telescope Structural Design Analysis Approaches for the Chromotomographic Hyperspectral Imaging Experiment*. AFIT/ENY/13M-02. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: N/A. [CSRA]

CAPRA, SALVATORE, *Cloud Computing Trace Characterization and Synthetic Workload Generation*. AFIT/ENG/13M-11. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: N/A.

COON, TIMOTHY E., *Opto-Mechanical Design of a Chromotomographic Imager Direct-Vision Prism Element*. AFIT/ENY/13M-07. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: N/A. [CSRA]

FERRY, GREGORY J., *Cost Growth above Inflation (CGAI) in Operating and Support (O&S) Costs in Raw Materials for Air Force Aircraft*. AFIT/ENC/13M-02. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

FLATLEY, BRIDGET N., *Rootkit Detection Using a Cross-View Clean Boot Method*. AFIT/ENG/13M-18. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A.

FREEMAN, CHARLTON E., *Multivariate and Naïve Bayes Text Classification Approach to Cost Growth Risk in Department of Defense Acquisition Programs*. AFIT/ENC/13M-03. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

GUPTILL, JOHN B., *Examining Application Components to Reveal Android Malware*. AFIT/ENG/13M-19. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A.

HILL, JONATHAN D., *Improving Bandwidth Utilization in a 1 Tbps Airborne MIMO Communications Downlink*. AFIT/ENG/13M-25. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A.

JONES, GARY L., *Investigation into the Ratio of System Operations and Support Costs to Life-Cycle Costs for Department of Defense Weapon Systems*. AFIT/ENC/13M-01. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

KASPARI, LUKE M., *The Moderating Effect of Network Centrality on the Relationship between Work Experience Variables and Organizational Commitment*. AFIT/ENV/13M-11. Faculty Advisor: Dr. John J. Elshaw. Sponsor: N/A.

MAUNTEL, BRIAN R., *Cognitive Mentorship: Mediating Protégé Performance*. AFIT/ENV/13M-14. Faculty Advisor: Dr. John J. Elshaw, PhD. Sponsor: N/A.

MOORE, BRIAN P., *Development, Integration, and Test of the ALICE CubeSat*. AFIT/ENY/13M-24. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A. [CSRA]

MOREHART, RYAN A., *Evaluating the Effectiveness of IP Hopping via an Address Routing Gateway*. AFIT/ENG/13M-35. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: N/A.

MUSSER, MORGAN L., *System Evolution with Technology; Analyzing Design Principles on the C-130*. AFIT/ENV/13S-04DL. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

MYERS, AARON T., *The Miniaturization of the AFIT Random Noise Radar*. AFIT/ENG/13M-37. Faculty Advisor: Dr. Peter J. Collins. Sponsor: N/A. [ANT]

OKUR, CIHAN, *The Effect of Defense R&D on Military Capability and Technological Spillover*. AFIT/ENV/13M-20. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: N/A.

PARKER, CARISSA M., *Management Information Systems and the Age of Social Media: An Investigation of Social Network Research*. AFIT/ENV/13M-37. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: N/A.

PEROT, JUAN E., *Foreign Military Sales: A Historical Review of Argentina's Purchases*. AFIT/ENC/13M-04. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

PICKENPAUGH, JOSEPH G., *Assessment of Potential Carbon Dioxide-Based Demand Control Ventilation System Performance in Single Zone Systems*. AFIT/ENV/13M-22. Faculty Advisor: Col Paul Cotelleso. Sponsor: N/A.

PLEAKE-TAMM, PEETER E., *The Use of Multi-Criteria Evaluation and Network Analysis in the Area Development Planning Process*. AFIT/ENV/13M-23. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: N/A.

POHL, KEVIN J., *Ground System Development - Enhancing AFIT Capabilities and Joining the MC3 Network*. AFIT/ENY/13M-38. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A. [CSRA]

PORTER, CRAIG C., *Training Maneuver Evaluation for Reduced Order Modeling of Stability & Control Properties Using Computational Fluid Dynamics*. AFIT/ENY/13M-28. Faculty Advisor: Capt Christopher L. Martin. Sponsor: N/A.

RUSSI, JASON G., *Effects of Stereoscopic 3D Digital Radar Displays on Air Traffic Controller Performance*. AFIT/ENV/13M-24. Faculty Advisor: Lt Col Brent T. Langhals. Sponsor: N/A.

RUYLE, DOUGLAS B., *Automated Improved Satellite Detection by Doppler Shifted Signals Off of the Air Force Space Surveillance System*. AFIT/ENY/13M-30. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A. [CSRA]

SALES, JAMES W., *Trajectory Optimization for Spacecraft Collision Avoidance*. AFIT/ENY/13S-01. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A. [CSRA]

SANTANA, LAURIENNE C.R.A., *Supplementary Computer Generated Cueing to Enhance Air Traffic Controller Efficiency*. AFIT/ENV/13M-25. Faculty Advisor: Lt Col Brent T. Langhals. Sponsor: N/A.

SCHUDROWITZ, CHRISTINE M., *The Effects of Observations and Maneuvers on Orbit Solutions*. AFIT/ENY/12D-01DL. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A. [CSRA]

SHIELDS, THOMAS F., *Engineering a Crosslink System for Distributed Networks of CubeSats*. AFIT/GSE/ENY/13M-01DL. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A.

THELEN, PAUL, *Solving Point-Reactor Kinetics Equations Using Exponential Moment Methods*. AFIT/ENP/13M-34. Faculty Advisor: Dr. Kirk A. Mathews. Sponsor: N/A.

TOLER, BENJAMIN F., *Novel Test Fixture for Characterizing Microcontacts: Performance and Reliability*. AFIT/ENG/13M-47. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: N/A.

WILSON, JOSHUA M., *The Design and Analysis of Electrically Large Custom-Shaped Reflector Antennas*. AFIT/ENG/13J-08. Faculty Advisor: Dr. Andrew J. Terzuoli. Sponsor: N/A.

GRADUATE RESEARCH PAPERS

BERGIN, DAVID M., *Use of Demographics to Predict High Risk Individuals for Suicide*. AFIT/ENS/GRP/13J-15. Faculty Advisor: Lt Col Sharon G. Heilmann. Sponsor: N/A. [COA]

CLARK, RONALD J., *Implementing an Integrated Network Defense Construct*. AFIT/ENG/GRP/13J-01. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: N/A. [CCR]

ISACCO, JOHN J., *Cost Avoidance Techniques for RC-135 Program Flying Training*. AFIT/ENS/GRP/13J-19. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: N/A. [COA]

MILLER, BRANDON L., *A Limited Evaluation of the Military Utility of Using Commercial Off the Shelf First Person Video Goggles to Acquire and Track a Human Sized Target*. AFIT/ENV/GRP/13J-04. Faculty Advisor: Dr. David R. Jacques. Sponsor: N/A.

PANTON, BRADLEY C., *Strengthening US DOD Cyber Security with the Vulnerability Market*. AFIT/ENV/GRP/13J-06. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

PIPER, RALPH E., *"To Be or Not To Be" ...Perceived Benefits of Mentoring in The United States Air Force*. AFIT/ENS/GRP/13J-22. Faculty Advisor: Lt Col Sharon G. Heilmann. Sponsor: N/A. [COA]

4.5. AIR FORCE MATERIEL COMMAND

MASTER'S THESES

BOLT, KARL E., *Supplier Quality Assessment Requirements (SQAR) and TAG Submission Analysis: Improving the Initial Submission Process at the F-22 Depot*. AFIT/ENS/13M-02. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AFMC/309 AMXG. [COA]

HUBER, TROY T., *Identifying, Tracking, and Prioritizing Parts Unavailability*. AFIT/ENS/13M-07. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AFMC/A4. [COA]

LEPIRE, KRISTA L., *Controlled Reception Pattern Antennas Testing with a Live-Sky Global Positioning System in an Anechoic Chamber*. AFIT/ENV/12D-03DL. Faculty Advisor: Dr. David R. Jacques. Sponsor: 746 TS.

MARSHALL, JOHN W., *An Evaluation of the Organizational Structure of Air Force Emergency Operations Centers Using Social Network Analysis and Design Structure Matrices*. AFIT/ENV/13M-13. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: AFMC/A7.

MORRILL, DANA F., *Overestimating Ballistic Flash with Biased Linear Regression*. AFIT/ENS/13M-13. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: AFMC/96 TG. [COA]

MYERS, ANDREW R., *Using Value-Focused Thinking as an Alternative Means of Opportunity Assessment for Strategic Sourcing Applications*. AFIT/ENV/13M-18. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFMC/771 ESS.

PAGE, JONNATHAN B., *Case Study Analysis of Trust and Commitment between the Civil Engineering Commodity Council and the Civil Engineering Career Field*. AFIT/ENV/13M-21. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFMC/771 ESS.

RABON, ROBERT S., *Continuous Process Improvement at Tinker Air Logistics Complex*. AFIT/ENS/13M-16. Faculty Advisor: Dr. Kenneth L. Schultz. Sponsor: AFMC/A4. [COA]

GRADUATE RESEARCH PAPERS

BROYLES, PHILIP N., *F-22 Depot Level Maintenance Delay and Disruption Record (DDR) Analysis*. AFIT/ENS/GRP/13J-16. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AFMC/309 AMXG. [COA]

PANKOSKI, JEREMY L., *A Delphi Study to Determine Variables for Predictive MICAP Modeling*. AFIT/ENS/GRP/13J-21. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AFMC/SCOG. [COA]

AIR FORCE LIFE CYCLE MANAGEMENT CENTER

MASTER'S THESES

CARNEY, SHAUN T., *Investigation into Risk and Uncertainty: Identifying Coefficient of Variation Benchmarks for Air Force ACAT I Programs*. AFIT/ENV/13M-05. Faculty Advisor: Lt Col Jonathan D. Ritschel. Sponsor: AFLCMC.

KELLER, BRANDON L., *Capturing Creative Program Management Best Practices*. AFIT/ENV/13M-12. Faculty Advisor: Lt Col Joseph R. Wirthlin. Sponsor: AFLCMC.

GRADUATE RESEARCH PAPERS

CONNER, ANDREW J., *Development of Military Flight Release Package, Test Safety Instruction and Initial Test Review Process at the Air Force Institute of Technology*. AFIT/ENV/GRP/13J-03. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFLCMC.

HALL, ZACHARY G., *C-17A Sustainment Performance Metrics Assessment: Repair Source Impact on Sustainment for Future Business Case Analysis Development*. AFIT/ENS/GRP/13J-17. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: AFLCMC. [COA]

AIR FORCE NUCLEAR WEAPONS CENTER

MASTER'S THESES

LOYD, NATHANIEL C., *Passive, Low Cost Neutron Detectors for Neutron Diagnostics at the National Ignition Facility*. AFIT/ENP/13M-23. Faculty Advisor: Dr. John W. McClory. Sponsor: AFNWC.

LYNES, DAVID D., *An Analysis of Methods to Determine Nuclear Weapon Yield Using Digital Fireball Films*. AFIT/ENP/13M-24. Faculty Advisor: Maj Benjamin R. Kowash. Sponsor: AFNWC.

MCMAHON, ROBERT E.T., II, *Neutron Displacement Damage Effects in InGaP/GaAs HBTs*. AFIT/ENP/12D-03. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.

MONROE, MISCHA L., *Element Identification for Forensics Analysis of Nuclear Fallout Debris Samples Utilizing Mico-XRF, SEM, and Autoradiography Mapping*. AFIT/ENP/13M-26. Faculty Advisor: Dr. John W. McClory. Sponsor: AFNWC.

PACLEB, CURTIS W., *Analysis of the Nuclear Thermal Pulse Using Digitized Scientific Test Films*. AFIT/ENP/13M-27. Faculty Advisor: LTC Stephen R. McHale. Sponsor: AFNWC.

ROWLAND, JON D., *Thermal Effects Analysis on F-16 Paint*. AFIT/ENP/13M-28. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.

RUSSI, SOFIA I., *Acquisitions Processes for Strategic Systems in the 21st Century*. AFIT/GSE/ENV/13M-05DL. Faculty Advisor: Lt Col Brent T. Langhals. Sponsor: AFNWC.

SCHERRER, ELIZABETH M., *Damage Equivalency Study of Ions and Neutrons in Silicon Bipolar Junction Transistors*. AFIT/ENP/13M-29. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.

AFRL: 711th HUMAN PERFORMANCE WING

MASTER'S THESES

MILLER, CRYSTAL A., *Evaluation of an Adaptive Automation Trigger Based on Task Performance, Priority, and Frequency*. AFIT/ENV/13J-01. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

NORVELL, ELIZABETH K., *Spectral Detection of Acute Mental Stress with VIS-SWIR Hyperspectral Imagery*. AFIT/ENG/13M-38. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: 711 HPW/RH.

SPLAWN, JOSHUA M., *Applying Hyperspectral Imaging to Heart Rate Estimation for Adaptive Automation*. AFIT/ENV/13M-30. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

URIBE, DAVID J., *An Investigation and Analysis of the Vestibulo-Ocular Reflex in a Vibration Environment*. AFIT/ENV/13M-32. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

WELLER-FAHY, DAVID J., *Network Intrusion Dataset Assessment*. AFIT/ENG/13M-49. Faculty Advisor: Dr Brett J. Borghetti. Sponsor: 711 HPW/RH. [ANT & CCR]

AFRL: AIR FORCE OFFICE OF SCIENTIFIC RESEARCH

DOCTORAL DISSERTATIONS

BUSCHELMAN, ERIC A., *A Nonparametric Approach to Segmentation of Ladar Images*. AFIT/DEE/ENG/12-07. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFOSR.

NEFF, BRIAN J., *Improving Multiple Surface Range Estimation of a 3-Dimensional FLASH LADAR in the Presence of Atmospheric Turbulence*. AFIT/ENG/DS/13J-01. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: AFOSR.

NORRIS, AARON G., *Experimental Characterization of the Structural Dynamics and Aero-Structural Sensitivity of a Hawkmoth Wing Toward the Development of Design Rules for Flapping Wing Micro Air Vehicles*. AFIT/ENY/DS/13M-40. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

SCHROCK, CHRISTOPHER R., *Distributional Monte Carlo Methods for the Boltzmann Equation*. AFIT/ENC/DS/13M-06. Faculty Advisor: Dr. Aihua W. Wood. Sponsor: AFRL/RQ & AFOSR.

MASTER'S THESES

BAILEY, KYLE O., *Computer Based Behavioral Biometric Authentication via Multi-Modal Fusion*. AFIT/ENG/13M-04. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFOSR.

BLAZEVIC, STJEPAN, *Photoacoustic Detection of Terahertz Radiation for Chemical Sensing and Imaging Applications*. AFIT/ENG/13M-08. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

CONRAD, MATTHEW M., *Integration of an Inter Turbine Burner to a Jet Turbine Engine*. AFIT/ENY/13M-06. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR.

CRANSTON, BRIAN C., *Evaluation of the Thorax of Manduca Sexta for Flapping Wing Micro Air Vehicle Applications*. AFIT/ENY/12D-03. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

DANNER, BRENT L., *Characterization of Metal-Insulator-Transition (MIT) Phase Change Materials (PCM) for Reconfigurable Components, Circuits, and Systems*. AFIT/ENG/13M-12. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

DAUBY, BOYCE H., *Application of Finite Element to Evaluate Material with Small Modulus of Elasticity*. AFIT/ENY/13M-08. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

FAGAN-KELLY, STEEFAN B., *Three Dimensional Positron Annihilation Momentum Spectroscopy of Lithium Tetraborate Crystals*. AFIT/ENP/13M-09. Faculty Advisor: Dr. Larry W. Burggraf. Sponsor: AFOSR.

FORD, MICHAEL, *Neutron Spectroscopy Using LiF Thin-Film Detectors*. AFIT/ENP/13M-10. Faculty Advisor: LTC Stephen R. McHale. Sponsor: AFOSR.

KEITH, ALANNA, *Discrimination of Neutral Postures in Computer Based Work*. AFIT/ENP/13M-19. Faculty Advisor: Dr. Amy L. Magnus. Sponsor: AFOSR. [CTISR]

LE, KATHLEEN H., *A Study of the Thermal Environment Developed by a Traveling Slipper at High Velocity*. AFIT/ENY/13M-20. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

LINGG, HEATHER A., *Dynamic Network Topologies*. AFIT/ENG/13J-04. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFOSR. [ANT]

MASON, JUSTIN K., *Finite Element Analysis of a Highly Flexible Flapping Wing*. AFIT/ENY/13M-22. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFOSR.

METLEN, TRENT, *Design of a Lighter than Air Vehicle that Achieves Positive Buoyancy in Air Using a Vacuum*. AFIT/ENY/13J-02. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

SAWYER, MELISSA A., *Material Characterization Using Passive Multispectral Polarimetric Imagery*. AFIT/ENG/13M-44. Faculty Advisor: Maj Milo W. Hyde, IV. Sponsor: AFOSR.

WILSON, JACOB D., *Characterizing G-Loading, Swirl Direction and Rayleigh Losses in an Ultra Compact Combustor*. AFIT/ENY/13S-02. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR & AFRL/RQ.

WUERTEMBERGER, LAUREN B., *Predicting the Wear of High Speed Rocket Sleds*. AFIT/ENY/12D-02. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

AFRL: AEROSPACE SYSTEMS DIRECTORATE

DOCTORAL DISSERTATIONS

HOEGER, TROY C., *CFD Transient Simulation of an Isolator Shock Train in a Scramjet Engine*. AFIT/ENY/DS/12-18. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

JOHNSON, JAMIE J., *Genetic Algorithm Optimization of a Film Cooling Array on a Modern Turbine Inlet Vane*. AFIT/ENY/DS/12-02. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

LYALL, MICHAEL E., *Effects of Front-Loading and Stagger Angle on Endwall Losses of High Lift Low Pressure Turbine Vanes*. AFIT/ENY/DS/12-05. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

SCHROCK, CHRISTOPHER R., *Distributional Monte Carlo Methods for the Boltzmann Equation*. AFIT/ENC/DS/13M-06. Faculty Advisor: Dr. Aihua W. Wood. Sponsor: AFRL/RQ & AFOSR.

MASTER'S THESES

- CARL, JUSTIN R., *Power Requirements for Bi-Harmonic Amplitude and Bias Modulation Control of a Flapping Wing Micro Air Vehicle*. AFIT/ENY/13M-37. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RQ.
- DEBARMORE, NICK D., *Characterization of Rotating Detonation Engine Exhaust Through Nozzle Guide Vanes*. AFIT/ENY/13M-09. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.
- ENGBRETSSEN, COLIN C., *Using Hysteretic Energy to Evaluate Damping Characteristics of Hard Coating on Titanium*. AFIT/ENY/13M-13. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFRL/RQ.
- HUSABOE, TRAVIS D., *Effects of Temperature on the Performance of a Small Internal Combustion Engine at Altitude*. AFIT/ENY/13M-17. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.
- LENZEN, ROBERT K., *Development of Optimized Piezoelectric Bending Actuators for Use in an Insect Sized Flapping Wing Micro Air Vehicle*. AFIT/ENY/13M-21. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RQ.
- ROBERTSON, JACOB J., *Film Cooling in Fuel Rich Environments*. AFIT/ENY/13M-27. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.
- SHUCK, TIMOTHY J., *Development of Autonomous Optimal Cooperative Control in Relay Rover Configured Small Unmanned Aerial Systems*. AFIT/ENV/13M-27. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RQ.
- SONGER, SCOTT A., *Aerial Networking for the Implementation of Cooperative Control on Small Unmanned Aerial Systems*. AFIT/ENV/13M-29. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFRL/RQ.
- STORM, SARAH E., *Evaluating the Effect of Integrated System Health Management on Mission Effectiveness*. AFIT/ENV/13M-31. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RQ.
- TEONG, KERWIN C., *Architecting Integrated System Health Management for Airworthiness*. AFIT/ENV/13S-01. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RQ.
- THEUERKAUF, SCOTT W., *Heat Exchanger Design and Testing for a 6-Inch Rotating Detonation Engine*. AFIT/ENY/13M-33. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.
- VINESKI, CHRISTOPHER D., *Experimental Analysis of Dampened Breathing Mode Oscillation on Hall Effect Thruster Performance*. AFIT/ENY/13M-39. Faculty Advisor: Capt David Liu. Sponsor: AFRL/RQ. [CSRA]
- WELBORN, JONATHAN W., *Calibration and Extension of a Discrete Event Operations Simulation Modeling Multiple Un-Manned Aerial Vehicles Controlled by a Single Operator*. AFIT/ENV/13M-34. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFRL/RQ.
- WESTMAN, ANDREW J., *Study of Laminar Flame 2-D Scalar Values at Various Fuel to Air Ratios Using an Imaging Fourier-Transform Spectrometer and 2-D CFD Analysis*. AFIT/ENP/13M-36. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: AFRL/RQ.
- WILSON, JACOB D., *Characterizing G-Loading, Swirl Direction and Rayleigh Losses in an Ultra Compact Combustor*. AFIT/ENY/13S-02. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR & AFRL/RQ.
- WOLF, ERIC T., *Porous Emitter Colloid Thruster Performance Characterization Using Optical Techniques*. AFIT/ENY/13M-36. Faculty Advisor: Capt David Liu. Sponsor: AFRL/RQ. [CSRA]

AFRL: DIRECTED ENERGY DIRECTORATE

DOCTORAL DISSERTATIONS

BENTLEY, BROOK I., *Scattering, Adsorption, and Langmuir-Hinshelwood Desorption Models for Physisorptive and Chemisorptive Gas-Surface Systems*. AFIT/ENY/DS/13S-01. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: AFRL/RD.

MASTER'S THESES

BECKER, DAVID J., *Laser Illuminated Imaging: Multiframe Beam Tilt Tracking and Deconvolution Algorithm*. AFIT/ENG/13M-07. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: AFRL/RD.

LLOYD, ROBERT L., *Multipactor Discharge in High Power Microwave Systems: Analyzing Effects and Mitigation through Simulation in ICEPIC*. AFIT/ENP/13M-22. Faculty Advisor: Dr. William F. Bailey. Sponsor: AFRL/RD. [CDE]

PUTNAM, ISAAC B., *Atmospheric Impact on Long Pulse Laser Detection and Ranging (LADAR) Systems*. AFIT/ENG/13M-39. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: AFRL/RD.

AFRL: INFORMATION DIRECTORATE

DOCTORAL DISSERTATIONS

NOEL, GEORGE E., *Image Annotation and Topic Extraction Using Super-Word Latent Dirichlet Allocation*. AFIT/ENG/DS/13S-03. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RI. [CCR]

MASTER'S THESES

EMGE, JAMES E., *Cognitive Augmentation for Network Defense*. AFIT/ENG/13M-16. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RI. [ANT]

HANNAN, JAMES C., *Mobile Network Defense Interface for Cyber Defense and Situational Awareness*. AFIT/ENG/13M-21. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: AFRL/RI. [ANT]

KNIGHT, MICHAEL P., *Development of a Response Planner Using the UCT Algorithm for Cyber Defense*. AFIT/ENG/13M-28. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: AFRL/RI.

RAULERSON, EVAN L., *Modeling Cyber Situational Awareness through Data Fusion*. AFIT/ENG/13M-41. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RI. [ANT]

AFRL: MATERIALS AND MANUFACTURING DIRECTORATE

MASTER'S THESES

ADOMANIS, BRYAN M., *A Characterization Study of Highly-Tailorable 3-D Metamaterials in the Thermal Infrared for Spectral and Directive Emission Behaviors*. AFIT/ENP/13M-01. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: AFRL/RX. [CDE]

DERIENZO, JOSEPH M., *Biaxial (Tension-Torsion) Testing of an Oxide/Oxide Ceramic Matrix Composite*. AFIT/ENY/13M-10. Faculty Advisor: Dr. Marina B. Ruggles-Wrenn. Sponsor: AFRL/RX.

KRESS, ROBERT J., *Analysis of a Van De Graaff Generator for EMP Direct Current Survivability Testing*. AFIT/ENP/13M-39. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFRL/RX.

SHILLIG, THEODORE R., *Creep of Hi-Nicalon S Fiber Tows at Elevated Temperature in Air and in Steam*. AFIT/ENY/13M-31. Faculty Advisor: Dr. Marina B. Ruggles-Wrenn. Sponsor: AFRL/RX.

SHINN, JAMES F., *Changes to Tensile Strength and Electromagnetic Shielding Effectiveness in Neutron Irradiated Carbon Nanocomposites*. AFIT/ENP/13M-32. Faculty Advisor: Dr. John W. McClory. Sponsor: AFRL/RX.

AFRL: MUNITIONS DIRECTORATE

MASTER'S THESES

DEAN, JAMES W., *Real-time Heading Estimation using Perspective Features*. AFIT/ENG/13M-13. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RW. [ANT]

HARDIN, JOSHUA A., *Information Encoding on a Pseudo Random Noise Radar Waveform*. AFIT/ENG/13M-22. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RW. [ANT]

QUARMYNE, JAMES O., *Inertial Navigation System Aiding Using Vision*. AFIT/ENG/13M-40. Faculty Advisor: Dr. Meir Pachter. Sponsor: AFRL/RW. [ANT]

WILSON, RUSSELL D., IV, *Adaptations and Analysis of the AFIT Noise Radar Network for Indoor Navigation*. AFIT/ENG/13M-50. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RW. [ANT]

AFRL: SENSORS DIRECTORATE

DOCTORAL DISSERTATIONS

DERRISO, MARK M., *Machine Conscious Architecture for State Exploitation and Decision Making*. AFIT/ENG/DS/13M-01. Faculty Advisor: Dr. Richard A. Raines. Sponsor: AFRL/RX. [CCR]

HACK, DANIEL E., *Passive MIMO Radar Detection*. AFIT/ENG/DS/13S-07. Faculty Advisor: Dr. Michael A. Saville. Sponsor: AFRL/RX.

HAKER, MARSHALL E., *Modeling the Effects of the Local Environment on a Received GNSS Signal*. AFIT/DEE/ENG/12-11. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RX. [ANT]

HARMER, PAUL K., *Development of a Learning from Signals Classifier for Cognitive Software Defined Radio Applications*. AFIT/ENG/DS/13M-02. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RX. [CCR]

REISING, DONALD R., *Exploitation of RF-DNA for Device Classification and Verification Using GRLVQI Processing*. AFIT/ENG/DS/12-04. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RX. [CCR]

STONE, SAMUEL J., *Radio Frequency Based Programmable Logic Controller Anomaly Detection*. AFIT/ENG/DS/13S-05. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RX. [CCR]

MASTER'S THESES

ARCHER, MICHAEL D., *High Frequency Magnetic Field Direction Finding Using MGL-S8A B-dot Sensors*. AFIT/ENG/13M-02. Faculty Advisor: Lt Col Geoffrey A. Akers. Sponsor: AFRL/RX.

ARMIJOS, JULIO D., *Complex Signal Processing in the RF Domain*. AFIT/ENG/13M-03. Faculty Advisor: Dr. Mary Y. Lanzerotti. Sponsor: AFRL/RX.

BIGLEY, ANDREW L., *Horn's Curve Estimation Through Multi-Dimensional Interpolation*. AFIT/ENS/13M-01. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/RX. [COA]

BOOTH, MATTHEW B., *Verification of Commercial SatCom Device Identities Using Radio Frequency-Distinct Native Attributes (RF-DNA)*. AFIT/ENG/13M-09. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RX. [CCR]

DUBENDORFER, CLAY K., *Using RF-DNA Fingerprints to Discriminate ZigBee Devices in an Operational Environment*. AFIT/ENG/13M-15. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/Ry. [CCR]

HARVEY, EVAN P., *All-Optical Logic Gates and Wavelength Conversion via the Injection-Locking of a Fabry-Perot Semiconductor Laser*. AFIT/ENG/13M-23. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/Ry.

HADJIS, JOHN A., *Automatic Modulation Classification of Common Communication and Pulse Compression Radar Waveforms Using Cyclic Features*. AFIT/ENG/13M-20. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFRL/Ry.

GIBSON, ALAN S., *Applied Hypergame Theory for Network Defense*. AFIT/ENG/13J-02. Faculty Advisor: Dr. Gary B. Lamont. Sponsor: AFRL/Ry.

KEITH, STEPHANIE R., *Discrimination between Child and Adult Forms Using Radar Frequency Signature Analysis*. AFIT/ENP/13M-20. Faculty Advisor: Dr. Amy L. Magnus. Sponsor: AFRL/Ry. [CTISR]

KUHAR, BENJAMIN J., *RF Emitter Tracking and Intent Assessment*. AFIT/ENG/13M-29. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFRL/Ry. [ANT]

LEHMAN, NATHAN J., *Constitutive Parameter Measurement Using Double Ridge Waveguide*. AFIT/ENG/13M-30. Faculty Advisor: Dr. Michael J. Havrilla. Sponsor: AFRL/Ry.

LORENZINI, PHILIP E., *Sensitivity Analysis of an Automated Calibration Routine for Airborne Cameras*. AFIT/ENG/13M-51. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/Ry. [ANT]

MARCHAND, ANTHONY D., *Neutron Shielding Effectiveness of Multifunctional Composite Materials*. AFIT/ENP/13M-25. Faculty Advisor: Dr. John W. McClory. Sponsor: AFRL/Ry.

MARIETTA, DANIEL A., *Error Characterization of Vision-Aided Navigation Systems*. AFIT/ENG/13M-33. Faculty Advisor: Lt Col Kenneth A. Fisher. Sponsor: AFRL/Ry. [ANT]

MCLEAN, RYAN K., *An Architecture for Coexistence with Multiple Users in Frequency Hopping Cognitive Radio Networks*. AFIT/ENG/13M-34. Faculty Advisor: Maj Mark D. Silvius. Sponsor: AFRL/Ry.

RYAN, DAVID A., *A Multi Agent System for Flow-Based Intrusion Detection*. AFIT/ENG/13M-43. Faculty Advisor: Dr. Gary B. Lamont. Sponsor: AFRL/Ry.

SCHMIDT, JOHN R., *Characterization and Dynamic Analysis of Long-Cavity Multi-Section Gain-Levered Quantum-Dot Lasers*. AFIT/ENG/13M-45. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/Ry.

SKIPPLE, SCOTT A., *The Role of Customer Engagement in Innovation Adoption*. AFIT/ENV/12D-01. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFRL/Ry.

STEVENS, SEAN R., *Metrics for Emitter Selection for Multistatic Synthetic Aperture Radar*. AFIT/ENG/13S-03. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFRL/Ry.

VRANICAR, TREVOR J., *Airborne Network Data Availability Using Peer to Peer Database Replication on a Distributed Hash Table*. AFIT/ENG/13M-48. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/Ry. [ANT]

ZIEGLER, JOSHUA S., *The Dynamic Multi-Objective Multi-Vehicle Covering Tour Problem*. AFIT/ENG/13J-09. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/Ry.

GRADUATE RESEARCH PAPERS

WADDELL, ELWOOD T., JR., *Online Cluster Analysis Supporting Real Time Anomaly Detection in Hyperspectral Imagery*. AFIT/ENS/GRP/13J-25. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/RV. [COA]

AFRL: SPACE VEHICLES DIRECTORATE

MASTER'S THESES

BASTOW, LANDON B., *Modeling the Impact of the Payload Alert Communications System (PACS) on the Accuracy of Conjunction Analysis*. AFIT/ENV/13M-01. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: AFRL/RV. [CSRA]

CLAYBROOK, JOHN R., *Feasibility Analysis on the Utilization of the Iridium Satellite Communications Network for Resident Space Objects in Low Earth Orbit*. AFIT/ENY/13M-04. Faculty Advisor: Dr. William E. Wiesel. Sponsor: AFRL/RV. [CSRA]

FREY, WILLIAM R., *Modeling the Thermosphere as a Driven-Dissipative Thermodynamic System*. AFIT/ENP/13M-11. Faculty Advisor: Capt Matthew B. Garvin. Sponsor: AFWA & AFRL/RV.

IMHOF, ERIC A., *Chip-Scale Magnetic Source of Cold Atoms*. AFIT/ENP/13J-03. Faculty Advisor: Dr. Glen P. Perram. Sponsor: AFRL/RV.

JOHNSON, SAMUEL C., *Design of a Control Moment Gyroscope Attitude Actuation System for the Attitude Control Subsystem Proving Ground*. AFIT/ENY/13M-19. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

NEWMAN, REX H., *Analysis and Validation of a CubeSat-Class Solar Array and Battery Module*. AFIT/ENY/13M-26. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

AIR FORCE SEEK EAGLE OFFICE

MASTER'S THESES

HANSON, COLIN Q., *Effect of Underwing Missile Fins and Canards on F-16 Limit Cycle Oscillations*. AFIT/ENY/13M-15. Faculty Advisor: Dr. Donald L. Kunz. Sponsor: AFSEO.

AIR FORCE SUSTAINMENT CENTER

MASTER'S THESES

LESSIN, AARON M., *Estimating the Probability of Being the Best System: A Generalized Method and Nonparametric Hypothesis Test*. AFIT/ENS/13M-10. Faculty Advisor: Dr. John O. Miller. Sponsor: AFMC/AFSC. [COA]

GRADUATE RESEARCH PAPERS

RYAN, LISA B., *Advancing Forward-Looking Metrics: A Linear Program Optimization and Robust Variable Selection for Change in Stock Levels as a Result of Recurring MICAP Parts*. AFIT/ENS/GRP/13J-9. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: AFMC/AFSC. [COA]

AIR FORCE TEST PILOT SCHOOL

MASTER'S THESES

TURNER, RICHARD J., *Improved Dive Angle Planning for Negative Excess Power Test Points Using the Analytic Dive Angle Planning Tool (ADAPT)*. AFIT/ENY/13M-34. Faculty Advisor: Lt Col Richard E. Huffman, Jr. Sponsor: AFTPS.

4.6. AIR MOBILITY COMMAND

MASTER'S THESES

FINKBEINER, SCOTT C., *Urgent Aeromedical Evacuation Network Capacity Planning*. AFIT/ENS/13M-04. Faculty Advisor: Dr. Jeffery K. Cochran. Sponsor: AMC. [COA]

SHIVELEY, THEODORE C., *Determining Optimal Machine Replacement Events with Periodic Inspection Intervals*. AFIT/ENC/13M-17. Faculty Advisor: Maj James D. Cordeiro. Sponsor: AMC/A9.

GRADUATE RESEARCH PAPERS

ANDERSON, JASON R., *Drawing the Red Line: Cost Benefit Analysis on Large Life Rafts*. AFIT/ENS/GRP/13J-1. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: AMC/A3. [COA]

CHAPA, MARK A., *Predicting Aircraft Availability*. AFIT/ENS/GRP/13J-2. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AMC/A4. [COA]

GRAHAM, STEPHEN C., *Aeromedical Evacuation Capacity Analysis for Defense Support of Civil Authorities*. AFIT/ENS/GRP/13J-3. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC/A9. [COA]

LANGSTROTH, THEODORE A., IV, *Forecasting Demand for KC-135 Sorties: Deploy to Dwell Impacts*. AFIT/ENS/GRP/13J-15. Faculty Advisor: Lt Col Bradley E. Anderson. Sponsor: AMC/A9. [COA]

MCALLISTER, ROBERT D., *Overcoming KC-10 Formal Training Unit Pilot Production Challenges*. AFIT/ENS/GRP/13J-6. Faculty Advisor: Lt Col Doral E. Sandlin. Sponsor: AMC/60 OG. [COA]

OELRICH, AARON J., *AMD and TACC Consolidation: A Delphi Study*. AFIT/ENS/GRP/13J-8. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: AMC/TACC. [COA]

SIVILLE, JAMES L., *The Air Mobility En Route System: A Paradigm Shift?* AFIT/ENS/GRP/13J-10. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AMC/A8. [COA]

SUMMERS, MARC W., *E² Cargo Transport-The Necessary Inclusion of Primary Oceanic Airlift*. AFIT/ENS/GRP/13J-11. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AMC/A9. [COA]

THEISS, RYAN L., *Identifying Factors that Most Strongly Predict Aircraft Reliability Behavior*. AFIT/ENS/GRP/13J-12. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AMC/A9. [COA]

THOMAS, MARK R., *Determining Intra-Theater Airlift Requirements from Number of Personnel Deployed in a Region*. AFIT/ENS/GRP/13J-13. Faculty Advisor: Lt Col Doral E. Sandlin. Sponsor: AMC/A9. [COA]

WICK, STEVEN P., *Incentivizing CRAF Beyond 2014*. AFIT/ENS/GRP/13J-14. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC/A9. [COA]

4.7. AIR FORCE SPACE COMMAND

MASTER'S THESES

HARKER, JAMES W., *The Future of Mobile Information and Communication Technology in Austere Environments: A Command and Control Technology Integration Perspective*. AFIT/ENV/13M-10. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: 689 CCW.

IVERSON, PRESTON B., *Evaluating Change Management Processes and Systems Using ITIL and Business Process Modeling*. AFIT/ENG/13M-26. Faculty Advisor: Dr. Robert F. Mills. Sponsor: 24 AF/26 NOS. [CCR]

SOINE, ANDREW T., *Needed Actions within Defense Acquisitions Based on a Forecast of Future Mobile Information and Communications Technologies Deployed in Austere Environments*. AFIT/ENV/13M-28. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: AFSPC.

GRADUATE RESEARCH PAPERS

RUETER, BRADLEY A., *Cyberspace Integration with the Air Operations Center*. AFIT/ENG/GRP/13J-02. Faculty Advisor: Dr. Robert F. Mills. Sponsor: 24 AF/A3. [CCR]

SPACE AND MISSILE SYSTEMS CENTER

MASTER'S THESES

HUSCKO, ANDRE M., & SETO, JOSEPH N., *Applying Model Based System Engineering (MBSE) Methods to Perform Modeling and Simulation of Space Situational Awareness (SSA) Architectures*. AFIT/ENV/13J-01DL. Faculty Advisor: Dr. David R. Jacques. Sponsor: SMC.

OVERMYER, JUSTIN M., *Process Reliability Modeling Evolved Expendable Launch Vehicle (EELV) Mission Assurance*. AFIT/ENV/13S-03DL. Faculty Advisor: Dr. John M. Colombi. Sponsor: SMC.

SETO, JOSEPH N., See HUSCKO, ANDRE M.

4.8 AIR FORCE RESERVE COMMAND

GRADUATE RESEARCH PAPERS

MORALES, MICHAEL, *Managing Airborne Relief during International Disasters*. AFIT/ENS/GRP/13J-7. Faculty Advisor: Lt Col Doral E. Sandlin. Sponsor: AFRC. [COA]

4.9. USAF FIELD OPERATING AGENCIES/DIRECT REPORTING UNITS

AIR FORCE CIVIL ENGINEERING CENTER

MASTER'S THESES

BLOMBERG, DANIEL L., *An Analysis of Cost Premiums and Losses Associated with USAF Military Construction (MILCON)*. AFIT/ENV/13M-02. Faculty Advisor: Col Paul Cotelleso. Sponsor: AFCEC.

BROST, GAVIN D., *Successfully Implementing Net-Zero Energy Policy through the Air Force Military Construction Program*. AFIT/ENV/13M-04. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: AFCEC.

MURLEY, DAVID J., *Using Geographic Information Systems to Evaluate Energy Initiatives in Austere Environments*. AFIT/ENV/13M-17. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFCEC.

MEIHAUS, JUSTIN C., *Understanding the Effects of Climate on Airfield Pavement Deterioration Rates*. AFIT/ENV/13M-16. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFCEC.

AIR FORCE MANPOWER AGENCY

GRADUATE RESEARCH PAPERS

SZWARC, MEGHAN M., *The Air Force System Acquisition Management Manpower Regression Analysis*. AFIT/ENS/GRP/13J-24. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: AFMA. [COA]

AIR FORCE MEDICAL LOGISTICS OFFICE

MASTER'S THESES

WHITSON, CHAD W., *Strategic Consolidation of Medical War Reserve Material (WRM) Equipment Unit Type Codes (UTC) Assemblages*. AFIT/ENS/13M-23. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AFMLO. [COA]

AIR FORCE MEDICAL SUPPORT AGENCY

MASTER'S THESES

MEIDINGER, TRAVIS J., *Influence of Media Size and Flow Rate on the Transport of Silver Nanoparticles in Saturated Porous Media: Laboratory Experiments and Modeling*. AFIT/ENV/13M-15. Faculty Advisor: Maj LeeAnn Racz. Sponsor: AFMSA.

SCHMIDT, MICHAEL A., *Health Risk Assessments of Waste Combustion Emissions Using Surrogate Analyte Models*. AFIT/ENV/13M-26. Faculty Advisor: Lt Col Dirk P. Yamamoto. Sponsor: AFMSA.

AIR FORCE PERSONNEL CENTER

MASTER'S THESES

KIEFFER, MITCHELL R., *Traumatic Brain Injury Recovery Care: Demand Forecasting, Staffing, and Treatment Planning*. AFIT/ENS/13M-08. Faculty Advisor: Dr. Jeffery K. Cochran. Sponsor: AFW2. [COA]

AIR FORCE TECHNICAL APPLICATION CENTER

DOCTORAL DISSERTATIONS

MCNABB, SUZANNA J., *An Exponential Moment Method for Modeling Transient Behavior in Multicomponent Isotope Enrichment Cascades*. AFIT/ENP/DS/13J-02. Faculty Advisor: Dr. Kirk A. Mathews. Sponsor: AFTAC.

MASTER'S THESES

HIGLEY, TIMOTHY M., *Modeling Radioactive Decay Chains with Branching Fraction Uncertainties*. AFIT/ENP/13M-14. Faculty Advisor: Dr. Kirk A. Mathews. Sponsor: AFTAC.

RUNCO, ANTHONY M., *Detection Optimization of the Progressive Multi-Channel Correlation Algorithm Used in Infrasound Nuclear Treaty Monitoring*. AFIT/ENG/13M-42. Faculty Advisor: Lt Col James A. Louthain. Sponsor: AFTAC.

AIR FORCE WEATHER AGENCY

MASTER'S THESES

BROADWATER, DAVID J., *A Comparison of Ionospheric Model Performance for International Space Station Orbits*. AFIT/ENP/13M-04. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: AFWA, USU/CASS & NASA.

FREY, WILLIAM R., *Modeling the Thermosphere as a Driven-Dissipative Thermodynamic System*. AFIT/ENP/13M-11. Faculty Advisor: Capt Matthew B. Garvin. Sponsor: AFWA & AFRL/RV.

SHEPHERD, JACK A., III, *Optimization of Coronal Mass Ejection Ensemble Forecasting Using WSA-ENLIL with Coned Model*. AFIT/ENP/13M-31. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: NASA & AFWA.

NATIONAL AIR AND SPACE INTELLIGENCE CENTER

DOCTORAL DISSERTATIONS

BOSTICK, RANDALL L., *Development and Characterization of a Chromotomosynthetic Hyperspectral Imaging System*. AFIT/ENP/DS/13M-02. Faculty Advisor: Dr. Glen P. Perram. Sponsor: NASIC. [CTISR]

MASTER'S THESES

JACOB, MARTIN A., *Passive Ranging Using a Dispersive Spectrometer and Optical Filters*. AFIT/ENP/12D-02. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: NASIC. [CTISR]

SATCHELL, MATTHEW J., *Air Radiation Modeling for Hypersonic Vehicles*. AFIT/GA/ENY/13M-41. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: NASIC.

UNITED STATES AIR FORCE ACADEMY

DOCTORAL DISSERTATIONS

BUCHANAN, DOUGLAS A., *EPR and ENDOR Studies of Point Defects in Lithium Tetraborate Crystals*. AFIT/ENP/DS/12D-01. Faculty Advisor: Dr. John W. McClory. Sponsor: USAFA.

MASTER'S THESES

EATON, ADRIANNA J., *Vibrational Analysis and Characterization of a Space-Based Deployable Photon Sieve System*. AFIT/ENY/13M-12. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: USAFA. [CSRA]

4.10. DEPARTMENT OF DEFENSE

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY

MASTER'S THESES

MAKSIM, STEPHEN D., *A Study of Dim Object Detection for the Space Surveillance Telescope*. AFIT/ENG/13M-32. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: DARPA.

DEFENSE THREAT REDUCTION AGENCY

MASTER'S THESES

BLANNING, AARON B., *Electronic Characteristics of Rare Earth Doped GaN Schottky Diodes*. AFIT/ENP/13M-03. Faculty Advisor: LTC Stephen R. McHale. Sponsor: DTRA.

CARLSON, EVAN J., *Development of a Spectropolarimetric Capability*. AFIT/ENP/13M-05. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: DTRA. [CTISR]

HOFFMANN, LUCAS J., *Thermogravimetric Analysis of Bacillus Anthracis Spores and DNA by Spectroscopy and Chromatography of Pyrolysis Products*. AFIT/ENP/13M-15. Faculty Advisor: Dr. Larry W. Burggraf. Sponsor: DTRA.

SETHI, NEERAJ, *Modeling Sodium Iodide Detector Response Using a Parametric Equations*. AFIT/ENP/13M-30. Faculty Advisor: Maj Benjamin R. Kowash. Sponsor: DTRA.

HIGH ENERGY LASER JOINT TECHNOLOGY OFFICE

DOCTORAL DISSERTATIONS

GALLAGHER, JEFFREY E., *Optically Pumped Atomic Rubidium Lasers: Two-Photon and Exciplex Excitation Mechanisms*. AFIT/ENP/DS/13J-01. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

LOPER, ROBERT D., *Collisional Broadening and Shift of D1 and D2 Spectral Lines in Atomic Alkali Vapor - Noble Gas Systems*. AFIT/ENP/DS/13M-03. Faculty Advisor: Dr. David E. Weeks. Sponsor: HELJTO. [CDE]

RICE, CHRISTOPHER A., *Investigation of Diode Pumped Alkali Laser Atmospheric Transmission Using Tunable Diode Laser Absorption Spectroscopy*. AFIT/ENP/DS/12D-07. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

MASTER'S THESES

ESHEL, BEN, *Spectral Analysis and Metastable Absorption Measurements of High Pressure Capacitively and Inductively Coupled Radio-Frequency Argon Helium Discharges*. AFIT/ENP/13J-02. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

GUY, MATTHEW R., *Investigation of the Atmospheric Propagation of Alkali Lasers in a Maritime Environment Using Tunable Diode Laser Atmospheric Spectroscopy*. AFIT/ENP/13M-12. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

RICHARDS, RYAN M., *Mirrorless Lasing in Optically Pumped Rubidium Vapor*. AFIT/ENP/13M-41. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

TAGUBA, CHAD T., *Pump Diode Characterization for an Unstable Diode-Pumped Alkali Laser Resonator*. AFIT/ENP/13M-33. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

OFFICE OF THE SECRETARY OF DEFENSE

MASTER'S THESES

BOBSEIN, KLAYTON S., *Analysis of Effects of Organizational Behavior on Evolving System of Systems Acquisition Programs through Agent Based Modeling*. AFIT/ENV/13M-03. Faculty Advisor: Dr. John M. Colombi. Sponsor: OSD.

DRINKWATER, RYAN L., *Estimating and Measuring Application Latency of Typical Distributed Interactive Simulation (DIS) - Based Simulation Architecture*. AFIT/ENG/13M-14. Faculty Advisor: Dr. Douglas D. Hodson. Sponsor: OSD.

HILLMAN, ALEXANDER P., *Aerial Refueling Simulator Validation Using Operational Experimentation and Response Surface Methods with Time Series Responses*. AFIT/ENS/13M-06. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD. [COA]

HUNT, ERIC M., *Crack Initiation and Growth Behavior at Corrosion Pit in 7075-T6 High Strength Aluminum Alloy*. AFIT/ENY/13J-01. Faculty Advisor: Dr. Shankar Mall. Sponsor: OSD.

RITTER, SEAN C., *An Examination of Statistical Rigor Infused into the KC-46 Flight Test Program*. AFIT/ENS/13M-18. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD. [COA]

OPERATIONALLY RESPONSIVE SPACE OFFICE

MASTER'S THESES

INGRAHAM, STEVEN P., *Dynamic Constellation Tasking and Management*. AFIT/ENY/13M-18. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: ORSO. [CSRA]

NASTASI, KEVIN M., *Maneuverability Analysis against a Counterspace Mission Architecture*. AFIT/ENY/13M-25. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: ORSO. [CSRA]

UNITED STATES ARMY

DOCTORAL DISSERTATIONS

PAUL, JASON V., *Metamaterial Structure Design Optimization: A Study of the Cylindrical Cloak*. AFIT/ENG/DS/13M-04. Faculty Advisor: Dr. Peter J. Collins. Sponsor: NRTF.

MASTER'S THESES

DRUMM, MOLLIE C., *Computational Simulation of Explosively Generated Pulsed Power Devices*. AFIT/ENY/13M-11. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: AMRDEC.

UNITED STATES NAVY

MASTER'S THESES

BARKI, ANUM, *An Inverse Kinematic Approach Using Groebner Basis Theory Applied to Gait Cycle Analysis*. AFIT/ENP/13M-02. Faculty Advisor: Dr. Ronald F. Tuttle. Sponsor: NRL. [CTISR]

BEST, JEREMY S., *Electron Damage Effects on Carbon Nanotube Thin Films*. AFIT/ENP/13M-37. Faculty Advisor: Dr. John W. McClory. Sponsor: NRL.

MUTUNGA, DANIEL K., *Identifying System Patterns to Resolve Challenges in the Test and Evaluation Operation*. AFIT/ENG/ENV/13M-03DL. Faculty Advisor: Dr. John M. Colombi. Sponsor: AWTAP.

GRADUATE RESEARCH PAPERS

AUGER, CHRISTOPHER M., BALDUS, LARS, & YOSHIMOTO, BRIAN K., *Modeling Space Launch Process Delays to Improve Space Vehicle Acquisition Timelines*. AFIT/ENV/GRP/13J-01. Faculty Advisor: Dr. John M. Colombi. Sponsor: NPS.

BALDUS, LARS, See AUGER, CHRISTOPHER M.

YOSHIMOTO, BRIAN K., See AUGER, CHRISTOPHER M.

UNITED STATES EUROPEAN COMMAND

GRADUATE RESEARCH PAPERS

HAGES, LEE D., *Quantifying the European Strategic Airlift Gap*. AFIT/ENS/GRP/13J-4. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: EUCOM/USAFE. [COA]

UNITED STATES PACIFIC COMMAND

MASTER'S THESES

HAGER, JOSHUA A., *An Analysis of Factors that Influence the Success of Expeditionary Civil Engineer Hub-and-Spoke Organizations*. AFIT/ENV/13M-09. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: PACAF.

UNITED STATES SPECIAL OPERATIONS COMMAND

MASTER'S THESES

MILLER, ERIC A., *A Network Analysis of Social Balance in Conflict in the Maghreb*. AFIT/ENS/13M-12. Faculty Advisor: Dr. Richard F. Deckro. Sponsor: USSOCOM.

UNITED STATES TRANSPORTATION COMMAND

MASTER'S THESES

CLAPP, BENJAMIN A., *Vehicle Minimization for the Multimodal Pickup and Delivery Problem with Time Windows*. AFIT/ENS/13M-03. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

HAFICH, MICAH J., *A Mixed Integer Programming Model for Improving Theater Distribution Force Flow Analysis*. AFIT/ENS/13M-05. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

LEONARD, TAYLOR J., *Operational Planning of Channel Airlift Missions Using Forecasted Demand*. AFIT/ENS/13M-09. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

GRADUATE RESEARCH PAPERS

SIMONCIC, ADAM D., *Aircraft Block Speed Calculations for JOSAC/USTRANSCOM Aircraft Using Linear Regression*. AFIT/ENS/GRP/13J-23. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

4.11. OTHER FEDERAL AGENCIES

DEPARTMENT OF HOMELAND SECURITY

MASTER'S THESES

BRISTOW, JONATHAN S., *Learning Enterprise Malware Triage from Automatic Dynamic Analysis*. AFIT/ENG/13M-10. Faculty Advisor: Maj Thomas E. Dube. Sponsor: DHS. [CCR]

BASNIGHT, ZACHARY H., *Firmware Counterfeiting and Modification Attacks on Programmable Logic Controllers*. AFIT/ENG/13M-06. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

CASTILOW, JACOB G., *Crystal Growth and Characterization of ThO_2 and $\text{U}_x\text{Th}_{1-x}\text{O}_2$* . AFIT/ENP/13M-06. Faculty Advisor: Capt Timothy W. Zens. Sponsor: DHS.

DUNLAP, STEPHEN J., *Timing-Based Side Channel Analysis for Anomaly Detection in the Industrial Control System Environment*. AFIT/ENG/13J-01. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

JAROMIN, ROBERT M., *Emulation of Industrial Control Field Device Protocols*. AFIT/ENG/13M-27. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

HADFIELD, ZACHARY L., *Cathodoluminescence and Thermoluminescence of Undoped LTB and LTB:A ($A = \text{Cu}, \text{Ag}, \text{Mn}$)*. AFIT/ENP/13M-13. Faculty Advisor: Dr. Robert L. Hengehold. Sponsor: DHS.

HEARLE, JOHN A., *Side-Channel Analysis of Subscriber Identity Modules*. AFIT/ENG/13J-03. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: DHS. [CCR]

LEE, MICHAEL G., *Depth-Resolved Cathodoluminescence of Thorium Dioxide*. AFIT/ENP/13M-21. Faculty Advisor: Dr. Robert L. Hengehold. Sponsor: DHS.

SICKENDICK, KARL A., *File Carving and Malware Identification Algorithms Applied to Firmware Reverse Engineering*. AFIT/ENG/13M-46. Faculty Advisor: Maj Thomas E. Dube. Sponsor: DHS. [CCR]

OTIS, JEREMY R., *Evaluation of Cyber Sensors for Enhancing Situational Awareness in the ICS Environment*. AFIT/ENG/13J-06. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

ENVIRONMENTAL PROTECTION AGENCY

MASTER'S THESES

JANECZKO, ALLEN K., *Biodegradation of an Organophosphate Chemical Warfare Agent Simulant by Activated Sludge with Varying Solid Retention Times*. AFIT/ENV/13M-38. Faculty Advisor: Maj LeeAnn Racz. Sponsor: NHSRC.

WALTERS, EDWARD B., *Fate of Malathion in an Activated Sludge Municipal Wastewater Treatment System*. AFIT/ENV/13M-33. Faculty Advisor: Maj LeeAnn Racz. Sponsor: NHSRC.

FEDERAL AVIATION ADMINISTRATION

MASTER'S THESES

CZABARANEK, JOSEPH A., *Pseudolite Architecture and Performance Analysis for the FAA's NextGen Airspace*. AFIT/ENV/13M-07. Faculty Advisor: Dr. David R. Jacques. Sponsor: FAA.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

MASTER'S THESES

BROADWATER, DAVID J., *A Comparison of Ionospheric Model Performance for International Space Station Orbits*. AFIT/ENP/13M-04. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: AFWA, USU/CASS & NASA.

SHEPHERD, JACK A., III, *Optimization of Coronal Mass Ejection Ensemble Forecasting Using WSA-ENLIL with Coned Model*. AFIT/ENP/13M-31. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: NASA & AFWA.

NATIONAL SCIENCE FOUNDATION

DOCTORAL DISSERTATIONS

POTEET, MIRIAM J., *Parametrizing Finite Frames and Optimal Frame Completions*. AFIT/ENC/DAM/12-02. Faculty Advisor: Dr. Matthew C. Fickus. Sponsor: NSF.

MASTER'S THESES

COOKE, DAVID J., *A Discrete X-Ray Transform for Chromotomographic Hyperspectral Imaging*. AFIT/ENC/13M-05. Faculty Advisor: Dr. Matthew C. Fickus. Sponsor: NSF.

4.12. NON-FEDERAL SPONSORS

AMERICAN SOCIETY FOR ENGINEERING EDUCATION

MASTER'S THESES

SMITH, BRETT A., *Kernel Extended Real-Valued Negative Selection Algorithm (KERNSA)*. AFIT/ENG/13J-07. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: ASEE.

BRAZILIAN AIR FORCE

MASTER'S THESES

SILVA, PAULA F., *Activity-Based Calculation Models for the Brazilian Air Force Cellular Unit of Intendancy*. AFIT/ENS/13M-21. Faculty Advisor: Lt Col Bradley E. Anderson. Sponsor: Brazilian Air Force. [COA]

COLLEGE OF PERFORMANCE MANAGEMENT

MASTER'S THESES

CRUMRINE, KEVIN T., *A Comparison of Earned Value Management and Earned Schedule as Schedule Predictors on DOD ACAT I Programs*. AFIT/ENV/13M-36. Faculty Advisor: Lt Col Jonathan D. Ritschel. Sponsor: CPM.

DAYTON AREA GRADUATE STUDIES INSTITUTE

DOCTORAL DISSERTATIONS

KAUFFMAN, KYLE J., *Radar Based Navigation in Unknown Terrain*. AFIT/ENG/DS/12-03. Faculty Advisor: Dr. John F. Raquet. Sponsor: DAGSI. [ANT]

GLOBAL VELOCITY

MASTER'S THESES

BARTO, WILLIAM C., *Classification of Encrypted Web Traffic Using Machine Learning Algorithms*. AFIT/ENG/13J-11. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: Global Velocity. [CCR]

LOCKHEED MARTIN

MASTER'S THESES

CLEAVER, TIMOTHY A., *Aerodynamic Characterization of an Air-to-Air Missile with Computational Fluid Dynamics*. AFIT/ENY/13M-05. Faculty Advisor: Capt Christopher L. Martin. Sponsor: Lockheed Martin.

CLARK, FRANK T., *Experimental Evaluation of the Aerodynamics of an Air-To-Air Missile*. AFIT/ENY/13M-03. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: Lockheed Martin.

MINISTRY OF DEFENCE (SINGAPORE)

MASTER'S THESES

PEK, EDMUND K., *Development of Availability and Sustainability Spares Optimization Models for Aircraft Repairables*. AFIT/ENS/13S-4. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: MINDEF. [COA]

TURKISH AIR FORCE

MASTER'S THESES

OZDEMIR, ALHMET, *Evaluating Courses of Actions at the Strategic Planning Level*. AFIT/ENS/13M-14. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: TuAF. [COA]

UTAH STATE UNIVERSITY

MASTER'S THESES

BROADWATER, DAVID J., *A Comparison of Ionospheric Model Performance for International Space Station Orbits*. AFIT/ENP/13M-04. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: AFWA, USU/CASS & NASA.

5. ACADEMIC DEPARTMENT PUBLICATIONS AND FUNDING INFORMATION

5.1. DEPARTMENT OF AERONAUTICS AND ASTRONAUTICS

Access Phone: 937-255-3069, DSN 785-3069

Fax: 937-656-7621, DSN 986-7621

Homepage: <http://www.afit.edu/en/eny/>

5.1.1	<u>DOCTORAL DISSERTATIONS</u>	48
5.1.2	<u>MASTER'S THESES</u>	48
5.1.3	<u>FACULTY BIOGRAPHIES & RESEARCH OUTPUT</u>	51

5.1.1. DOCTORAL DISSERTATIONS

BENTLEY, BROOK I., *Scattering, Adsorption, and Langmuir-Hinshelwood Desorption Models for Physisorptive and Chemisorptive Gas-Surface Systems*. AFIT/ENY/DS/13S-01. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: AFRL/RD.

HOEGER, TROY C., *CFD Transient Simulation of an Isolator Shock Train in a Scramjet Engine*. AFIT/ENY/DS/12-18. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

JOHNSON, JAMIE J., *Genetic Algorithm Optimization of a Film Cooling Array on a Modern Turbine Inlet Vane*. AFIT/ENY/DS/12-02. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

LYALL, MICHAEL E., *Effects of Front-Loading and Stagger Angle on Endwall Losses of High Lift Low Pressure Turbine Vanes*. AFIT/ENY/DS/12-05. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

NORRIS, AARON G., *Experimental Characterization of the Structural Dynamics and Aero-Structural Sensitivity of a Hawkmoth Wing Toward the Development of Design Rules for Flapping Wing Micro Air Vehicles*. AFIT/ENY/DS/13M-40. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

5.1.2. MASTER'S THESES

BIRGE, CHRISTOPHER A., *Hardware Design, Integration, and Test for the ALICE CubeSat Mission*. AFIT/ENY/13M-01. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: N/A. [CSRA]

BLUNCK, KACEY E., *Space Telescope Structural Design Analysis Approaches for the Chromotomographic Hyperspectral Imaging Experiment*. AFIT/ENY/13M-02. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: N/A. [CSRA]

CARL, JUSTIN R., *Power Requirements for Bi-Harmonic Amplitude and Bias Modulation Control of a Flapping Wing Micro Air Vehicle*. AFIT/ENY/13M-37. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RQ.

CLARK, FRANK T., *Experimental Evaluation of the Aerodynamics of an Air-To-Air Missile*. AFIT/ENY/13M-03. Faculty Advisor: Dr. Mark F. Reeder. Sponsor: Lockheed Martin.

CLAYBROOK, JOHN R., *Feasibility Analysis on the Utilization of the Iridium Satellite Communications Network for Resident Space Objects in Low Earth Orbit*. AFIT/ENY/13M-04. Faculty Advisor: Dr. William E. Wiesel. Sponsor: AFRL/RV. [CSRA]

CLEAVER, TIMOTHY A., *Aerodynamic Characterization of an Air-to-Air Missile with Computational Fluid Dynamics*. AFIT/ENY/13M-05. Faculty Advisor: Capt Christopher L. Martin. Sponsor: Lockheed Martin.

CONRAD, MATTHEW M., *Integration of an Inter Turbine Burner to a Jet Turbine Engine*. AFIT/ENY/13M-06. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR.

COON, TIMOTHY E., *Opto-Mechanical Design of a Chromotomographic Imager Direct-Vision Prism Element*. AFIT/ENY/13M-07. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: N/A. [CSRA]

CRANSTON, BRIAN C., *Evaluation of the Thorax of Manduca Sexta for Flapping Wing Micro Air Vehicle Applications*. AFIT/ENY/12D-03. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

DAUBY, BOYCE H., *Application of Finite Element to Evaluate Material with Small Modulus of Elasticity*. AFIT/ENY/13M-08. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

DEBARMORE, NICK D., *Characterization of Rotating Detonation Engine Exhaust Through Nozzle Guide Vanes*. AFIT/ENY/13M-09. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

DERIENZO, JOSEPH M., *Biaxial (Tension-Torsion) Testing of an Oxide/Oxide Ceramic Matrix Composite*. AFIT/ENY/13M-10. Faculty Advisor: Dr. Marina B. Ruggles-Wrenn. Sponsor: AFRL/RX.

DRUMM, MOLLIE C., *Computational Simulation of Explosively Generated Pulsed Power Devices*. AFIT/ENY/13M-11. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: AMRDEC.

EATON, ADRIANNA J., *Vibrational Analysis and Characterization of a Space-Based Deployable Photon Sieve System*. AFIT/ENY/13M-12. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: USAFA. [CSRA]

ENGEBRETSEN, COLIN C., *Using Hysteretic Energy to Evaluate Damping Characteristics of Hard Coating on Titanium*. AFIT/ENY/13M-13. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFRL/RQ.

HANSON, COLIN Q., *Effect of Underwing Missile Fins and Canards on F-16 Limit Cycle Oscillations*. AFIT/ENY/13M-15. Faculty Advisor: Dr. Donald L. Kunz. Sponsor: AFSEO.

HUNT, ERIC M., *Crack Initiation and Growth Behavior at Corrosion Pit in 7075-T6 High Strength Aluminum Alloy*. AFIT/ENY/13J-01. Faculty Advisor: Dr. Shankar Mall. Sponsor: OSD.

HUSABOE, TRAVIS D., *Effects of Temperature on the Performance of a Small Internal Combustion Engine at Altitude*. AFIT/ENY/13M-17. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

INGRAHAM, STEVEN P., *Dynamic Constellation Tasking and Management*. AFIT/ENY/13M-18. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: ORSO. [CSRA]

JOHNSON, SAMUEL C., *Design of a Control Moment Gyroscope Attitude Actuation System for the Attitude Control Subsystem Proving Ground*. AFIT/ENY/13M-19. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

LE, KATHLEEN H., *A Study of the Thermal Environment Developed by a Traveling Slipper at High Velocity*. AFIT/ENY/13M-20. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

LENZEN, ROBERT K., *Development of Optimized Piezoelectric Bending Actuators for Use in an Insect Sized Flapping Wing Micro Air Vehicle*. AFIT/ENY/13M-21. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: AFRL/RQ.

MASON, JUSTIN K., *Finite Element Analysis of a Highly Flexible Flapping Wing*. AFIT/ENY/13M-22. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: AFOSR.

METLEN, TRENT, *Design of a Lighter than Air Vehicle that Achieves Positive Buoyancy in Air Using a Vacuum*. AFIT/ENY/13J-02. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

MOORE, BRIAN P., *Development, Integration, and Test of the ALICE CubeSat*. AFIT/ENY/13M-24. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A. [CSRA]

NASTASI, KEVIN M., *Maneuverability Analysis against a Counterspace Mission Architecture*. AFIT/ENY/13M-25. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: ORSO. [CSRA]

NEWMAN, REX H., *Analysis and Validation of a CubeSat-Class Solar Array and Battery Module*. AFIT/ENY/13M-26. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV. [CSRA]

POHL, KEVIN J., *Ground System Development - Enhancing AFIT Capabilities and Joining the MC3 Network*. AFIT/ENY/13M-38. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A. [CSRA]

PORTER, CRAIG C., *Training Maneuver Evaluation for Reduced Order Modeling of Stability & Control Properties Using Computational Fluid Dynamics*. AFIT/ENY/13M-28. Faculty Advisor: Capt Christopher L. Martin. Sponsor: N/A.

ROBERTSON, JACOB J., *Film Cooling in Fuel Rich Environments*. AFIT/ENY/13M-27. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFRL/RQ.

RUYLE, DOUGLAS B., *Automated Improved Satellite Detection by Doppler Shifted Signals Off of the Air Force Space Surveillance System*. AFIT/ENY/13M-30. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A. [CSRA]

SALES, JAMES W., *Trajectory Optimization for Spacecraft Collision Avoidance*. AFIT/ENY/13S-01. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A. [CSRA]

SATCHELL, MATTHEW J., *Air Radiation Modeling for Hypersonic Vehicles*. AFIT/GA/ENY/13M-41. Faculty Advisor: Dr. Robert B. Greendyke. Sponsor: NASIC.

SCHUDROWITZ, CHRISTINE M., *The Effects of Observations and Maneuvers on Orbit Solutions*. AFIT/ENY/12D-01DL. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A. [CSRA]

SHIELDS, THOMAS F., *Engineering a Crosslink System for Distributed Networks of CubeSats*. AFIT/GSE/ENY/13M-01DL. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A.

SHILLIG, THEODORE R., *Creep of Hi-Nicalon S Fiber Tows at Elevated Temperature in Air and in Steam*. AFIT/ENY/13M-31. Faculty Advisor: Dr. Marina B. Ruggles-Wrenn. Sponsor: AFRL/RX.

THEUERKAUF, SCOTT W., *Heat Exchanger Design and Testing for a 6-Inch Rotating Detonation Engine*. AFIT/ENY/13M-33. Faculty Advisor: Dr. Paul I. King. Sponsor: AFRL/RQ.

TURNER, RICHARD J., *Improved Dive Angle Planning for Negative Excess Power Test Points Using the Analytic Dive Angle Planning Tool (ADAPT)*. AFIT/ENY/13M-34. Faculty Advisor: Lt Col Richard E. Huffman, Jr. Sponsor: TPS.

VINESKI, CHRISTOPHER D., *Experimental Analysis of Dampened Breathing Mode Oscillation on Hall Effect Thruster Performance*. AFIT/ENY/13M-39. Faculty Advisor: Capt David Liu. Sponsor: AFRL/RQ. [CSRA]

WILSON, JACOB D., *Characterizing G-Loading, Swirl Direction and Rayleigh Losses in an Ultra Compact Combustor*. AFIT/ENY/13S-02. Faculty Advisor: Dr. Marc D. Polanka. Sponsor: AFOSR & AFRL/RQ.

WOLF, ERIC T., *Porous Emitter Colloid Thruster Performance Characterization Using Optical Techniques*. AFIT/ENY/13M-36. Faculty Advisor: Capt David Liu. Sponsor: AFRL/RQ. [CSRA]

WUERTEMBERGER, LAUREN B., *Predicting the Wear of High Speed Rocket Sleds*. AFIT/ENY/12D-02. Faculty Advisor: Dr. Anthony N. Palazotto. Sponsor: AFOSR.

5.1.3. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

AGTE, JEREMY S., Lt Col,

Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2011 (AFIT/ENY); BS Aeronautical Engineering, United States Air Force Academy, 1997; MS Mechanical Engineering, The George Washington University, 1999; PhD, Aeronautical and Astronautical Engineering, Massachusetts Institute of Technology, 2011. Lt Col Agte has significant experience in aircraft design and flight test engineering as a graduate of the U.S. Air Force Test Pilot School (01A). His research focus areas include aerospace systems design, multidisciplinary design optimization, multistate design for robustness, and optimal control. Tel. 255-3636 x4667, email: Jeremy.Agte@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Development of a Predictive Capability for Multidisciplinary Uncertainty and Sensitivity Analysis.”
Sponsor: AFRL/RQ. Funding: \$5,000.

REFEREED JOURNAL PUBLICATIONS

Agte, J., Borer, N., de Weck, O., “Design of Long Endurance Systems with Inherent Robustness to Partial Failures during Operations,” *ASME Journal of Mechanical Design*, Vol. 134, No. 10, Oct 2012. pp. 100903 (15 pages).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Thomas, J., Alyanak, E., Agte, J., Camberos, J., “Quantifying Uncertainty Across Fidelity Levels in the Design of Aerospace Systems,” AIAA-2013-4394, 13th AIAA Aviation, Technology, Integration, and Operations Conference, Los Angeles, CA, Aug 2013.

AYRES, BRADLEY J.,

Visiting Assistant Professor of Systems Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2012 (AFIT/ENY); BS, Chemical Engineering, University of Missouri, Columbia, 1982; M.A., Procurement and Acquisition Management, Webster University, St. Louis, 1991; M.S., Software Systems Management, Air Force Institute of Technology, 1992; PhD, Business Administration specializing in MIS, Florida State University, 2003. Dr. Ayres' research interests include development of complex systems. His is a member of AIAA, the Project Management Institute, and the International Council on Systems Engineering. Tel. 255-3355 x3422 email: Bradley.Ayres.ctr@afit.edu

BLACK, JONATHAN T.,

Director, Center for Space Research and Assurance, Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2007 (AFIT/ENY); BS Industrial Engineering, University of Illinois at Urbana-Champaign, 2001; MS Mechanical and Aerospace Engineering, Joint Institute for Advancement of Flight Sciences (joint NASA Langley Research Center and George Washington University program), 2003; PhD, Mechanical Engineering, University of Kentucky, 2006. Dr. Black has worked on several successful space experiments and AFIT's Space Vehicle Design sequence. His current research interests include structures, structural dynamics, advanced sensing technologies, space systems engineering, and novel orbit analysis for a wide variety of military and intelligence applications including large lightweight space structures, micro UAV development, and taskable satellites. He is the first AFIT recipient of an AFOSR Young Investigator Award and is an AIAA Associate Fellow. Tel. 255-3636 x4578, email: Jonathan.Black@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“AFIT Space Research in Support of SMC/SY.” Sponsor: SMC. Funding: \$34,999 – Black 40%, Lawrence 10%, Swenson 25%, H Hopkinson 25%. [CSRA]

“AFIT USSTRATCOM.” Sponsor: USSTRATCOM. Funding: \$100,000 – Black 50%, Jennings 25%, Simmons 25%. [CSRA]

“Characterizing MAV Wings in Flight.” Sponsor: AFOSR. Funding: \$31,500. [ANT]

“Imaging Chromotomographic Spectrometer Experiment (CTEx).” Sponsor: AS&T. Funding: \$50,000 – Black 34%, Cobb 33%, Swenson 33%. [CSRA]

“Imaging Chromotomographic Spectrometer Experiment (CTEx).” Sponsor: AS&T. Funding: \$55,000 – Black 40%, Cobb 30%, Swenson 30%. [CSRA]

“New Orbital Regimes for Flexible Collection and Reduced Vulnerability.” Sponsor: AS&T. Funding: \$25,000. [CSRA]

“New Structural Concepts for Very Large Antennas.” Sponsor: N/A. Funding: \$75,000 – Black 50%, Jennings 50%. [CSRA]

“Program Analyst for Integrated Air and Missile Defense.” Sponsor: MDA. Funding: \$150,000. [CSRA]

REFEREED JOURNAL PUBLICATIONS

Jennings, A.L., Black, J., Allen, C., “Empirical Bounding of Space Booms with Tape Spring Hinges,” *Shock and Vibration*, Vol. 20, No. 3, May – Jun 2013, pp. 503-517, DOI: 10.3233/SAV-130764. [CSRA]

Co, T.C., Zagaris, C., Black, J.T., “Responsive Satellites through Ground Track Manipulation using Existing Technology,” *Journal of Spacecraft and Rockets*, Vol. 50, No. 1, Jan. – Feb 2013, pp. 206-216, DOI: 10.2514/1.62192. [CSRA]

Yates, J.M., Spanbauer, B.W., Black, J.T., “Geostationary Orbit Development and Evaluation for Space Situational Awareness,” *Acta Astronautica*, Vol. 81, Iss. 1 Dec. 2012, pp. 256-272, DOI: 10.1016/j.actaastro.2012.05.011. [CSRA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Doyle, D., Jennings, A., Black, J., “Optical Flow Background Subtraction for Real-Time PTZ Camera Object Tracking” IEEE International Instrumentation and Measurement Technology Conference (I2MTC), Minneapolis, MN, May 2013.

Jennings, A.L., Black, J.T., Gutierrez, A.N., “Geometry and Moments of Bent Tape Springs,” 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Boston, MA, Apr. 2013, DOI: 10.2514/6.2013-1669. [CSRA]

Mason, J., Black, J.T., Jennings, A.L., Sharp, A., Blandino, J., Lysher, J., “Validation of a Finite Element Analysis of a Flapping Wing against Inertial and Aeroelastic Responses,” 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Boston, MA, Apr. 2013, DOI: 10.2514/6.2013-1708.

Jennings, A.L., Sharp, A., Doyle, D., Black, J., “Periodic and Average Flapping Wing Force Measurement,” 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Boston, MA, Apr. 2013, DOI: 10.2514/6.2013-1709.

Blunck, K., Coon, T.E., Swenson, E., Black, J., Cobb, R., “Space Telescope Structural Design Analysis for the Chromotomographic Hyperspectral Imaging Experiment,” 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Boston, MA, Apr. 2013, DOI: 10.2514/6.2013-1827. [CSRA]

Co, T.C., Black, J.T., “Responsiveness in Low Orbits using Electric Propulsion,” 2012 AIAA Guidance, Navigation, and Control Conference, Minneapolis, MN, Aug. 2012, AIAA Paper 2012-4918. [CSRA]

Blackstun, M., Swenson, E., Hart, S., Black, J., Cobb, R., “Design, Build, and Test of Engineering Development Spacecraft Hardware in a Satellite Design Course at the Air Force Institute of Technology,” American Society of Engineering Education International Forum 2012, Jun 2012. [CSRA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Executive Committee Member of the Ohio Space Grant Consortium representing AFIT.

AFIT-AFRL Space Colloquium AFIT Director.

EN Director, Center for Space Research and Assurance (CSRA).

EN Faculty Council Curriculum Development and Resource Committee member.

EN Dean’s Reader, Reising, D., ENG Dissertation.

EN Dean’s Reader, Kuciapinski, K., ENG Dissertation.

ENY Chair, Space Systems Certificate Program.

AIAA Structural Dynamics Technical Committee.

AIAA Gossamer Spacecraft Program Committee.

Reviewer: AIAA Journal, AIAA Journal of Aircraft, AIAA Journal of Spacecraft and Rockets, Acta Astronautica, Shock and Vibration.

Abstract Reviewer: AIAA/ASME/ASCE/AHS/ASC Conference on Structures, Structural Dynamics and Materials.

COBB, RICHARD G.,

Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2001 (AFIT/ENY); BS, the Pennsylvania State University, 1988; MS, Air Force Institute of Technology, 1992; PhD, Air Force Institute of Technology, 1996. Research interests include dynamics and control of flexible space structures for remote sensing applications, system identification techniques, control of micro air vehicles, and applications of optimal control theory. Prior to teaching at AFIT, Dr. Cobb was responsible for the establishment of an Air Force wide Reliability Centered Maintenance program to enhance jet engine reliability. In recognition of his accomplishments, Dr. Cobb was selected as the 2001 Senior Military Engineer of the Year for the Aeronautical Systems Center. Prior to his assignment at WPAFB in Sep 1999, Dr. Cobb served as program manager for the Air Force Research Laboratory's TechSat 21 program, a revolutionary satellite Technology program investigating the feasibility of using distributed micro-satellite constellations to satisfy Air Force global sensing requirements. While at Kirtland AFB NM, Dr. Cobb also served as the technical advisor for the Space Vehicles Technology Branch, and Chief of the Dynamic Systems Group. Dr Cobb is an Associate Fellow of AIAA. Tel. 937-255-3636 x4559 (DSN 785-3636 x4559), email: Richard.Cobb@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Automatic Airborne Collision Avoidance System for Remotely Piloted Aircraft (RPA).” Sponsor: AFRL/RQ. Funding: \$13,000. [ANT]

“Automatic Ground Collision Avoidance System Trajectory Optimization.” Sponsor: AFRL/RQ. Funding: \$12,000. [ANT]

“Development of Autonomous Small UAS for Search and Delivery Missions.” Sponsor: AFRL/RW. Funding: \$54,000 – Cobb 25%, Reeder 25%, Jacques 25%, Colombi 25%. [ANT]

“Collaborative Control for Multi-UAV Operations.” Sponsor: AFRL/RQ. Funding: \$20,000 – Cobb 25%, Jacques 25%, Colombi 25%, Pachter 25%. [ANT]

“GEO Space Situational Awareness.” Sponsor: AFRL/RV. Funding: \$80,000 – Cobb 34%, Wiesel 33%, Simmons 33%. [CSRA]

GREENDYKE, ROBERT B.,

Associate Professor of Aeronautics and Astronautics and Director, AFIT Scientist and Engineer Education Programs at Kirtland AFB; Appointment Date: 2005 (AFIT/ENY); BBA, Economics, Baylor University, 1979; BS, Aerospace Engineering, Texas A&M University, 1986; MS, Aerospace Engineering, Texas A&M University, 1988; PhD, Interdisciplinary Engineering, Texas A&M University, 1998. Dr. Greendyke's research interests include computational fluid dynamics, Direct Simulation Monte Carlo methods, hypersonic and reacting flows, radiation simulation, thermophysics, and plasma simulation. Dr. Greendyke was a Research Scientist at NASA-Langley Research Center studying re-entry and aerobraking flows, and an Associate Professor in the University of Texas at Tyler establishing a start-up Mechanical Engineering Program from concept through accreditation. He has published over 30 journal articles, technical reports and conference publications in multiple fields. He is an Associate Fellow of the American Institute of Aeronautics and Astronautics. Tel. 937-255-3636 x4567, email: Robert.Greendyke@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Computational and Experimental Investigations of Ablative-Radiative Hypersonic Flows.” Sponsor: AFOSR. Funding: \$17,437 – Greendyke 60%, Martin, C. 40%.

“Computational Examination of the Behavior of Electronics Materials under Extreme Mechanical and Thermal Stresses.” Sponsor: AFRL/RW. Funding: \$15,160.

“Computational Investigations of Explosive Initiation.” Sponsor: AFRL/RW. Funding: \$21,600.

“Cooperative Hypersonics Research.” Sponsor: NASIC. Funding: \$26,914.

“Evaluation of Hypersonic Reentry Vehicles.” Sponsor: NASIC. Funding: \$7,600.

“Investigation of Surface Emission Using ICEPIC.” Sponsor: AFRL/RD. Funding: \$25,000.

“Modeling and Simulation of Ferroelectric Generation.” Sponsor: AMRDEC. Funding: \$10,000.

“Use of the Generalized Polynomial Chaos Method in Wargaming Simulations.” Sponsor: USSTRATCOM. Funding: \$3,000.

JENNINGS, ALAN L.,

Research Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2013 (AFIT/ENY); BS Mechanical Engineering, University of Akron, 2006; MS Electrical Engineering, University of Dayton 2007; PhD, Electrical Engineering, University of Dayton, 2013. Dr. Jennings' research interests include dynamics of light-weight flexible structures, including flapping wing, space-structures and the non-contact measurement systems needed to characterize their behavior, machine vision, trajectory optimization and function approximation. His current work involves characterizing the deployment and operational precision of a large, sparse reflector in space, uncertainty in visual navigation induced by clouds, and measuring instantaneous forces of flapping wings by measuring the bob and surge via image processing. Dr. Jennings has also supported strategic exercises by visualization of space operations. Tel. 255-6565 x7495, email: Alan.Jennings@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Cloud-Induced Uncertainty for Visual Navigation.” Sponsor: DAGSI. Funding: \$43,498. [ANT]

REFEREED JOURNAL PUBLICATIONS

A. Jennings, J. Black and C. Allen, “Empirically Bounding of Space Booms with Tape Spring Hinges,” Shock and Vibration, Vol. 20, No. 3, pp. 503-517, May 2013. DOI: 10.3233/SAV-130764. [CSRA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Jennings, A.L., Black, J., Gutierrez, A.N., “Geometry and Moments of Bent Tape Springs,” AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 9-Aug-2013, DOI: 10.2514/6.2013-1669. [CSRA]

Mason, J., Black, J., Jennings, A.L., Sharp, A., Blandino, J., Lysher, J., “Validation of a Finite Element Analysis of a Flapping Wing against Inertial and Aeroelastic Responses” AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 9-Aug-2013, DOI: 10.2514/6.2013-1708.

Jennings, A.L., Sharp, A., Doyle, D., Black, J., “Periodic and Average Flapping Wing Force Measurement” AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 9-Aug-2013, DOI: 10.2514/6.2013-1709.

Jennings, A.L., Cobb, R., “Ambient Vibration Testing of a Segmented Mirror Telescope,” AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 11-Aug-2013, DOI: 10.2514/6.2013-1884. [CSRA]

Doyle, D.D., Jennings, A.L., Black, J.T., "Optical Flow Background Subtraction for Real-Time PTZ Camera Object Tracking" IEEE International Instrumentation and Measurement Technology Conference (I2MTC), 6-May 2013, DOI: 10.1109/I2MTC.2013.6555538.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Associate Editor for IEEE Access.

KING, PAUL I.,

Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 1991 (AFIT/ENY); BS, Arizona State University, 1971; MS, Air Force Institute of Technology, 1972; PhD, Oxford University, England, 1986. He is a former faculty member at the U.S. Air Force Academy and at the Cleveland State University. Dr. King's research interests include internal and external aerodynamics and heat transfer (wings and bodies, turbomachinery and other applications). His research emphasizes experimentation and instrumentation. He has published over 100 articles and reports and chaired over 70 theses and dissertations. Tel. 937-255-3636 x4628 (DSN 785-3636 x4628), email: Paul.King@afit.edu

KUNZ, DONALD L.,

Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2003 (AFIT/ENY); BS, Syracuse University, 1971; MS, Georgia Institute of Technology, 1972; PhD, Georgia Institute of Technology, 1976; Dr. Kunz's research interests include rotorcraft dynamics, vibrations, and loads, structural dynamics, aeroelasticity, multibody dynamics, smart structures, and computational structural mechanics. He has published more than 100 journal articles, conference papers, and technical reports. Prior to coming to AFIT, Dr. Kunz worked at the US Army Aeroflightdynamics Directorate, McDonnell Douglas Helicopter Company, Old Dominion University, and the US Army Aviation and Missile Command. He is an Associate Fellow of AIAA; a member of AHS and ASME; and a licensed professional engineer in the Commonwealth of Virginia. Tel. 937-255-3636 x4548 (DSN 785-3636 x4548), email: Donald.Kunz@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Research Support for Joint AFIT/TPS Test Management Projects.” Sponsor: AF TPS. Funding: \$27,385.

REFEREED JOURNAL PUBLICATIONS

Kolsti, K.F. and Kunz, D.L., “A Point Collocation Method for Geometrically Nonlinear Membranes,” International Journal of Solids and Structures, Vol. 50, No. 2, Jan 2013, pp. 288-296.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Hanson, C.Q., Kunz, D.L., and Lindsley, N.J., “Computational Investigation of the Effect of Missile Control Surfaces on F-16 Limit Cycle Oscillation,” AIAA 2013-1836, Proceedings of the AIAA/ASME/ASCE/AHS/ASC 54th Structures, Structural Dynamics and Materials Conference, Boston, Massachusetts, Apr 2013.

LIEBST, BRADLEY S.,

Professor of Aerospace Engineering and Head, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 1989 (AFIT/ENY); BS, Wichita State University, 1978; MS, Massachusetts Institute of Technology, 1979; PhD, Massachusetts Institute of Technology, 1981. Dr. Liebst's research interests include eigenstructure assignment and control, stability and control of aerospace vehicles, passive and active control of large flexible structures, and aircraft handling qualities. He has published over 30 articles and reports and chaired over 40 theses and dissertations. Prior to teaching at AFIT, Professor Liebst was Assistant Professor of Aerospace Engineering for 6 years at the University of Minnesota where he was voted the 1987 Best Institute of Technology (U of M) Professor. Tel. 937-255-3636 x4636 (DSN 785-6565 x4636), email: Bradley.Liebst@afit.edu

LIU, DAVID, Capt,

Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2011 (AFIT/ENY); BS Aerospace Engineering, University of Texas at Austin, 2002; MS Aerospace Engineering, University of Texas at Austin, 2004; PhD, Astronautical Engineering, Air Force Institute of Technology, 2011. Prior to his assignment to AFIT, Capt Liu was assigned to the AFRL, Space and Missile Directorate at Edwards AFB, CA as lead Experimental Test Engineer and later as Chief of Operations for the Experimental Demonstration Branch. Capt Liu was responsible for testing state-of-the-art rocket Technology for the USAF and other government agencies. Capt Liu was also part of the Joint Combat Assessment Team deployed to Afghanistan to determine the effects of combat damage on Joint aviation assets for the advancement of aircraft survivability efforts. Capt Liu's interests include experimental research in plasma phenomenon in electric propulsion and other aerospace applications. In addition, Capt Liu's interests include the improvement of aircraft survivability, advances in weapons design, Additive Manufacturing, and Topology Optimization. Capt Liu is a member of Tau Beta Pi, Sigma Gamma Tau, and AIAA. Tel. 255-3636 x4542, email: David.Liu@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

“Combat Aircraft Survivability Education.” Sponsor: OSD/JASPO. Funding: \$10,000.

“Combat Aircraft Survivability Education.” Sponsor: OSD/DOT&E. Funding: \$20,000.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Vineski, C. D., Liu, D., Hargus, W. A., “Experimental Analysis of Dampened Breathing Mode Oscillations on Hall Thruster Performance,” 60th JANNAF Propulsion Meeting/19th Modeling and Simulation/7th.

Liquid Propulsion/6thSpacecraft Propulsion Meeting/Joint Subcommittee Meeting, Colorado Springs, CO, 29 Apr - 2 May 2013. [CSRA]

MALL, SHANKAR,

Distinguished Professor, Department of Aeronautics and Astronautics, AFIT Appointment Date: 1986 (AFIT/ENY); BS, Mechanical Engineering, Banaras Hindu University, India, 1964; MS, Mechanical Engineering, Banaras Hindu University, 1966; PhD, Mechanical Engineering, University of Washington, 1977. Dr. Mall's research centers on composite and smart materials, fatigue and fracture. Dr. Mall has authored over 300 papers and has been the co-editor of a book and five conference proceedings. He is a Fellow of ASME, Associate Fellow of AIAA. He was also the Principal Materials Research Engineer, Materials and Manufacturing Directorate, Air Force Research Laboratory. Tel. 937-255-3636 x4587 (DSN 785-3636 x4587), email: Shankar.Mall@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Carbon Nanotubes Based Conductors and Coax Cables for Applications in Space Structures (Continuation).” Sponsor: AS&T. Funding: \$22,365.

“Carbon Nanotube Yarns' Performance under Tension Load.” Sponsor: AS&T. Funding: \$53,010.

“Characterizations of Ceramics Matrix Composite in Gas Turbine Engine Environments.” Sponsor: AFRL/RX. Funding: \$20,000.

“Characterization of Ceramics Matrix Composite Sub-Elements in Gas Turbine Engine Environments.” Sponsor: AFRL/ RX. Funding: \$30,000.

“Characterization of Single Crystal Alloys under Combined Thermomechanical Load and Combustion Environment.” Sponsor: AFOSR. Funding: \$26,195.

“Corrosion Fatigue Crack Formation and Growth Behavior and Uniaxial Loading Conditions.” Sponsor: OSD. Funding: \$180,000.

“Physics-Based Life Prediction Model Incorporating Environmental Effects for SiC/SiC Ceramic Matrix Composites.” Sponsor: AFRL/RX. Funding: \$45,000.

REFEREED JOURNAL PUBLICATIONS

Duncan, N. A., McClory, J. W., Petrosky, J. C. and Mall, S., “Changes to Electrical Conductivity in Electron Irradiated Nanocomposites,” *Journal of Radiation Effects Research and Engineering*, Vol. 30, 97-102, 2012.

Mall, S., Nye, A. R. and Jefferson, G., “Tension-Tension Fatigue behavior of Nextel 720/Alumina under Combustion Environment,” *International Journal of Applied Ceramic Technology*, Vol. 9, pp. 159-171, 2012.

Sabelkin, V., Misak, H. E., Mall, S., Asmatulu, R. and Kladitis, P. E., “Tensile Loading Behavior of Carbon Nanotube Wires <http://www.sciencedirect.com/science/article/pii/S0008622312001212>,” *Carbon*, Vol. 50, pp 2530-2538, 2012.

Mall, S. and Boyer, B. H., “Cyclic and Sustained Loading Behaviors of Oxide/Oxide Nextel™720/Alumina Composite with Double Edge Sharp Notch <http://www.sciencedirect.com/science/article/pii/S1359835X12000516?v=s5>,” *Composites Part A*: Vol. 43, pp 1153-1159, 2012.

Mall, S., “Electrically Conductive Nanocomposites for Structural Applications”, *Recent Advances in Nanostructured Materials: Synthesis, Characterization and Applications*, Apple Academic Press, 345-360, 2012.

Misak, H. E., Sabelkin, V., Mall, S., Asmatulu, R. and Kladitis, P. E., “Failure Analysis of Carbon Nanotube Wire,” *Carbon*, Vol. 50, pp 4871-79, 2012.

MARTIN, CHRISTOPHER L., Capt,

Assistant Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 2012 (AFIT/ENY); BSE: Mechanical, University of Tennessee at Chattanooga, 2005;
MS Mechanical Engineering, University of New Mexico, 2008; PhD, Air Force Institute of Technology,
2011. Capt Martin's research interests include all aspects of Computational Fluid Dynamics with a particular
interest in modeling thermophysical phenomena, especially those associated with hypersonics,
nonequilibrium kinetics and radiation-gasdynamic interactions. Previous research has included the
computational modeling of plasma-based aerodynamic actuators and radiation-dominated reentry flow fields.
He is a member of Sigma Gamma Tau, Tau Beta Pi and AIAA. Tel. 255-3636 x4403, email:
Christopher.Martin@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Hot Streak Characterization in Serpentine Exhaust Nozzles.” Sponsor: AFRL/RV. Funding: \$19,530.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

36th AIAA Dayton-Cincinnati Aerospace Sciences Symposium (DCASS), Session Chair, Mar. 2013.

Defense Technical Information Center (DTIC), User Council, Member, Aug 2013-present.

PALAZOTTO, ANTHONY N.,

Distinguished Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT
Appointment Date: 1975 (AFIT/ENY); BS, New York University, 1955; MS, Brooklyn Polytechnic Institute,
1961; PhD, New York University, 1968. Professor Palazotto's interests include nonlinear mechanics, shell
analysis, finite elements, composite materials, viscoplasticity and nonlinear dynamics. Dr. Palazotto is the
co-author of a textbook, “The Nonlinear Analysis of Shell Structures,” published in 1992 by the AIAA. In
addition he has authored 221 archival technical publications and more than 500 technical presentations and
manuscripts. Dr. Palazotto received the Hetanyi Award in 1982 from the Society of Experimental Mechanics,
the Cleary Award in 1981 from the Air Force Materials Lab, the Structures and Materials Award from the
ASCE in 1986 and the AIAA Sustained Service Award in 2004. Dr. Palazotto is a Fellow of the ASCE; a
Fellow of the AIAA and a Fellow of the American Academy of Mechanics. He is a registered Professional
Engineer in the state of Ohio. Tel. 937-255-3636 x4599 (DSN 785-3636 x4599), email:
Anthony.Palazotto@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Evaluation of Lighter than Air Vehicles Using Unique Geometries.” Sponsor: AFOSR. Funding: \$28,202.

“Evaluation of Turbine Blades Including Damping.” Sponsor: AFRL/RQ. Funding: \$23,000.

“Extreme Wear-Resistant Materials.” Sponsor: AFOSR. Funding: \$105,700 – Palazotto 90%, Baker 10%.

“Lighter than Air Aircraft - Feasibility Study.” Sponsor: Aerovar Research, LLC. Funding: \$12,500.

“Structural Dynamics and Mechanics of Turbomachinery.” Sponsor: DAGSI. Funding: \$21,420.

REFEREED JOURNAL PUBLICATIONS

Gardenier, H., Palazotto, A., and Larson, R. “Development and Investigation of a Slotted Beam Impact
Experiment of Intermediate Strain Rates,” J. of Aerospace Engineering, ASCE, Vol. 25, No. 2, pp 294-307,
2012.

Abu-Al Rub, R., and Palazotto, A., “Nonlocal Gradient Dependent Constitutive Model for Simulating
Localized Damage and Fracture of Viscoplastic Solids Under High Energy Impacts,” J. of Multiscale
Computational Engineering, Vol. 10, No. 5, pp 503-526, 2012.

- Hale, C., Palazotto, A., and Baker, W., "Engineering Approach for the Evaluation of Mechanical Wear Considering the Experimental Holloman High Speed Test Track," J. Engineering Mechanics, ASCE, Vol. 138, No. 9, pp 1127-1140, and Sep, 2012.
- Hollenbeck, A., and Palazotto, A., "Methods Used to Evaluate the Hawkmoth (*Manduca Sexta*) as a Flapping Wing Micro Air Vehicle," Int. J. of Micro Air Vehicles, Vol. 4, No. 2, pp 119-132, 2012.
- Sabot, J., and Palazotto, A., "Structural Performance of Composite Material for a Slotted Wave Guide Antenna Stiffened Structure Under Compression," J. Composite Structures, Vol, 92, pp 202-212, 2013.
- O'Hara, R., and Palazotto, A., "The Morphological Characterization of the Forewing of the *Manduca Sexta* Species for the Application of Biomimetic Flapping Wing Micro Air Vehicles," IOP Science, Bioinspiration and Biomimetic, Vol. 7, 13pp, 2012.
- Demasi., Palazotto,A., Hollenbeck, A., and Cavellaro, R., "Exploratory Structural Investigation of a Hawkmoth Inspired MAV's Thorax," Int. J. Micro Air Vehicles, Vol. 4, No. 4, pp 291-304,Dec, 2012.
- Norris, A., Palazotto, A., and Cobb, R., "Experimental Structural Dynamic Characterization of the Hawkmoth (*Manduca Sexta*) Forewing," Int. J. Micro Air Vehicles, Vol. 5, No. 1, pp 39-54, Mar, 2013
- Voyiadjis, G., Almasri, A., Faghihi, D., and Palazotto, A., "Analytical Solution for Shear Bands in Cold-Rolled 1018 Steel," J. of Mechanical Behavior of Materials, Vol. 20, No. 4-6, pp 89-102, 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

- Hernandez, B. ,and Palazotto,A. , "Three Dimensional Finite Element Modeling of High Speed Sliding Wear" AIAA 2013- 1505, presented at the AIAA SDM conference, Apr 7-11, 2013, Boston, Mass.(presented by Carl Parsons Ctr).
- Metlen, Trent, and Palazotto,A., " Design of a Structure That Achieves Positive Buoyancy in Air Using a Vacuum," AIAA 2013-1881, , presented at the AIAA SDM conference, Apr 7-11, 2013, Boston, Mass.(presented by Carl Parsons Ctr).
- Parson, C., Chrissis, J., O'hara, R., and Palazotto, A., Direct Search Optimization of a Flapping Micro Air Vehicle Wing," AIAA 2013-1679,, presented at the AIAA SDM conference, Apr 7-11, 2013, Boston, Mass.

POLANKA, MARC D.,

Associate Professor of Aerospace Engineering, AFIT Appointment Date: 2009 (AFIT/ENY); BS, Mechanical Engineering, University of Dayton, 1992; MS, Mechanical Engineering, Stanford University, 1993; PhD, Mechanical Engineering, University of Texas, 1999; Prior to accepting a position with AFIT, Dr. Polanka served 17 years in Turbine Engine Division of the Air Force Research Laboratory's Propulsion Directorate. Dr. Polanka's research interests include aspects of heat transfer, combustion, and fluid mechanics focusing on experimental applications involving turbine and combustor aerodynamics and cooling techniques. He has been published in a variety of journals including the Journal of Turbomachinery, the AIAA Journal of Propulsion and Power, and the Journal of Engineering for Gas Turbines and Power. He also has two patents to his credit. Dr. Polanka is an Associate Fellow of the AIAA, the past Section Chair of the Dayton-Cincinnati Section of the AIAA, and the Honors and Awards Chair for the same section. Dr. Polanka serves as the Faculty representative for the AFIT Student Section branch of AIAA. He is also a Fellow of the ASME and serves on the Executive Board of the K-14 Committee of the International Gas Turbine Institute where he is also a past Point Contact for the annual Turbo Expo conference. Tel. 937-255-3636 x4714 (DSN 785-3636 x4714), email: Marc.Polanka@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“AFIT Combustion Laboratory Program Concerning UCC and Small Engine Combustion Phenomena.”
Sponsor: AFRL/RQ. Funding: \$25,000.

“Cooling Techniques to Minimize Impact of Secondary Reactions in a High Fuel Air Environment.” Sponsor:
Spectral Energies, LLC. (AFRL/RQ). Funding: \$60,000 – Polanka 90%, Rutledge 10%.

“Fundamental Issues in Integration of a UCC Combustor with a Turbine Vane.” Sponsor: AFOSR. Funding:
\$27,258 – Polanka 50%, Reeder 25%, Hartsfield 25%.

“Fundamental Understanding of Flowpath Issues through an Engine with an ITB and UCC Combustor.”
Sponsor: AFOSR. Funding: \$39,047.

REFEREED JOURNAL PUBLICATIONS

Rutledge, J.L. and Polanka, M.D. “Achieving a Specific Non-Uniform Heat Flux with an Electrical Heat Flux Plate,” *Journal of Heat Transfer*, Vol. 135, Aug 2013, 084502 1-7

Bohan, B.T. and Polanka, M.D. “Analysis of Flow Migration in an Ultra-Compact Combustor” *Journal of Engineering for Gas Turbines and Power*, Vol. 135, May 2013, 051502 1-11.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Greiner, N.J., Polanka, M.D., Robertson, J.R., Rutledge, J.L., “Effect of Variable Properties Within a Boundary Layer With Large Freestream to Wall Temperature Differences,” GT2013-94794, ASME Turbo Expo 2013, San Antonio, TX, 3-7 Jun, 2013.

Wilson, J.D. and Polanka, M.D., “Reduction Of Rayleigh Losses In A High G-Loaded Ultra Compact Combustor,” GT2013-94795, ASME Turbo Expo 2013, San Antonio, TX, 3-7 Jun, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Wilson, J.D., Conrad, M.M., and Polanka, M.D., “Flame Structure Effects at High G-Loading” AIAA-2013-3712, AIAA Joint Propulsion Conference, San Jose, CA, Jul 14-16, 2013.

Conrad, M.M., Wilson, J.D., and Polanka, M.D., “Integration Issues of an Ultra-Compact Combustor to a Jet Turbine Engine” AIAA-2013-3711, AIAA Joint Propulsion Conference, San Jose, CA, Jul 14-16, 2013.

Husaboe, T.D., Rittenhouse, J.A., Polanka, M.D., Litke, P., and Hoke, J.L. “Small Internal Combustion Engine Dependence on Inlet Pressure and Temperature at Altitude” AIAA-2013-3649, AIAA Joint Propulsion Conference, San Jose, CA, Jul 14-16, 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Best Paper Committee Chair for Heat Transfer Committee of IGTI Turbo Expo.

RADSICK, TIMOTHY C., Lt Col,

Assistant Professor of Aerospace Engineering and Deputy Head, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2011 (AFIT/ENY); BS Physics, Harvey Mudd College, 1991; MS Materials, University of California, Santa Barbara, 2001; PhD, Materials, University of California, Santa Barbara, 2007. Lt Col Radsick’s research interests include: processing of ceramics and ceramic matrix composites; advanced materials and fabrication techniques for aerospace and surface transport vehicles; aircraft life extension and corrosion prevention; and fuel-efficient ground vehicles, specifically hydraulic-pneumatic energy recovery systems and single-person vehicles. In previous assignments he served as Director of the USAF Academy’s Center for Aircraft Structural Life Extension (CAStLE) and as Assistant

Professor of Engineering Mechanics, was an ESEP Research Scientist at the German Aerospace Center (DLR/Köln-Porz), and researched advanced materials for spacelift at the Rocket Lab at Edwards AFB. In 2011, Lt Col Radsick deployed to Iraq as an Air Advisor and Chief of the New Al-Muthana Base Transition Team. Tel. 255-3636 x4204, email: Timothy.Radsick@afit.edu

REEDER, MARK F.,

Associate Professor of Aerospace Engineering, AFIT Appointment Date: 2002 (AFIT/ENY); BS, Mechanical Engineering, West Virginia University, 1989; MS, Mechanical Engineering, Ohio State University, 1991; PhD, Mechanical Engineering, Ohio State University, 1994; Prior to accepting a position with AFIT, Dr. Reeder served as an NRC Research Associate at NASA Glenn and subsequently as the manager of Research and Development for a manufacturer of industrial mixing equipment. Dr. Reeder's research interests include all aspects of fluid mechanics with an emphasis on experimental applications involving external aerodynamics, mixing enhancement and propulsion. Publications include a characterization of store separation from a cavity using pressure sensitive paint and measurements of a micro air vehicle using a 6-DOF balance. He has been published in a variety of journals including the Journal of Fluid Mechanics, Experiments in Fluids, The AIAA Journal, The AIAA Journal of Propulsion and Power, Physics of Fluids, NASA Tech Briefs, and Chemical Engineering Progress. He has four patents to his credit and is a licensed Professional Engineer in the State of Ohio. Dr. Reeder currently serves as the editor-in-chief of the International Journal of Micro Air Vehicles. Dr. Reeder is an Associate Fellow of the AIAA and a member of ASME. Tel. 937-255-3636 x4530 (DSN 785-3636 x4530), email: Mark.Reeder@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Acquiring PIV in the Trisonic Gas Facility with Clean Seeding." Sponsor: AFRL/RQ. Funding: \$28,800.

"Flight Testing" in the AFIT Low Speed Wind Tunnel." Sponsor: AFRL/RW. Funding: \$15,000 – Reeder 50%, Cobb 50%. [ANT]

"Flip-Turn" Missile Aerodynamic Characterization." Sponsor: Lockheed Martin. Funding: \$74,800 – Reeder 50%, Lofthouse 50%.

RUGGLES-WRENN, MARINA B.,

Professor of Aerospace Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2003 (AFIT/ENY); BS, Polytechnic Institute of New York, 1981; MS, Rensselaer Polytechnic Institute, 1983; PhD, Rensselaer Polytechnic Institute, 1987. Dr. Ruggles-Wrenn's interests center on mechanics of materials and structures, including experimental investigation of time-dependent material behavior, high-temperature structural materials, advanced composite materials, high-temperature structural design methods, and viscoplasticity. Dr. Ruggles-Wrenn has published over 90 journal articles and technical reports, and has co-authored 7 books on fatigue, fracture, and high temperature structural design methods. Dr. Ruggles-Wrenn received several research and best paper awards, Col. Gage H. Crocker Outstanding Professor Award as well as the AFIT Instructor of the Quarter Award. Prior to joining AFIT Dr. Ruggles-Wrenn was a research staff member at the Oak Ridge National Laboratory (1987-2003). Dr. Ruggles-Wrenn is a member of the Editorial Board of Applied Composite Materials. She is also currently serving as an Associate Technical Editor of the ASME Journal of Pressure Vessel Technology and has served in that capacity previously (1996-2002). She has chaired the ASME PVPD Design & Analysis Technical Committee (2006-2010). She currently serves as the Communications Chair of the ASME PVPD and is a member of the ASME PVPD Executive Committee. Dr. Ruggles-Wrenn is a member of The American Ceramic Society and a Fellow of the American Society of Mechanical Engineers. Tel. 937-255-3636 x4641 (DSN 785-3636 x4641), email: Marina.Ruggles-Wrenn@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Mechanical Properties and Fatigue Behavior of Unitized Composite Airframe Structures at Elevated Temperatures." Sponsor: AFRL/RQ. Funding: \$10,000.

“Mechanical Properties, Creep Deformation and Durability of Ultra High Temperature Ceramics for Aerospace Materials Systems in Extreme Environments.” Sponsor: AFOSR. Funding: \$39,464.

REFEREED JOURNAL PUBLICATIONS

M. B. Ruggles-Wrenn and G. Kurtz, “Notch sensitivity of fatigue behavior of a Hi-Nicalon™/SiC-B₄C composite at 1200 °C in air and in steam,” *Applied Composite Materials*, Vol. 20, 2013, pp. 891-905.

C. J. Armani, M. B. Ruggles-Wrenn, R. S. Hay and G. E. Fair, “Creep and microstructure of Nextel™720 fiber at elevated temperature in air and in steam,” *Acta Materialia*, Vol. 61, 2013, pp. 6114-6124.

C. J. Armani, M. B. Ruggles-Wrenn, G. E. Fair and R. S. Hay, “Creep of Nextel™610 fiber at 1100 °C in air and in steam,” *International Journal of Applied Ceramic Technology*, Vol. 10, No. 2, 2013, pp. 276-284.

M. B. Ruggles-Wrenn and T. P. Jones, “Tension-compression fatigue behavior of a SiC/SiC ceramic matrix composite at 1200 °C in air and in steam,” *International Journal of Fatigue*, Vol. 47, 2013, pp. 154-160.

C. E. C. Ryther and M. B. Ruggles-Wrenn, “The rate (time) – dependent mechanical behavior of the PMR-15 thermoset polymer at temperatures in the 274-316 °C range: experiments and modeling,” *Journal of Pressure Vessel Technology*, *Transactions ASME*, Vol. 134, No. 6, Dec 2012, pp. 061404-1 - 061404-

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

M. Pope and M. B. Ruggles-Wrenn, “Creep Behavior in Interlaminar Shear of a Hi-Nicalon/SiC Ceramic Matrix Composite at 1200 °C in Air and in Steam,” *Proceedings of the 37th International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach FL, Jan 27–Feb 1, 2013.

M. B. Ruggles-Wrenn, B. Steffens and T. Shillig, “Creep Behavior of Hi-Nicalon-S Fiber Tows at Elevated Temperature in Air and in Steam,” *Proceedings of the 37th International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach FL, Jan 27–Feb 1, 2013.

R. Hay, G. Fair, M. B. Ruggles-Wrenn, and C. Armani, “Microstructural Evolution during Creep Testing of Nextel 610 and Nextel 720 in Air and Steam,” *Proceedings of the 37th International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach FL, Jan 27–Feb 1, 2013.

R. Hay, G. Fair, M. B. Ruggles-Wrenn, and B. Steffens, “Effects of Stress and Steam on Oxidation Rates of Hi-Nicalon-S SiC Fiber,” *Proceedings of the 37th International Conference & Exposition on Advanced Ceramics & Composites*, Daytona Beach FL, Jan 27–Feb 1, 2013.

R. Hay, G. Fair and M. B. Ruggles-Wrenn, “SiC Fiber Strengths after Oxidation in Wet and Dry Air, Steam and Low pO₂,” *Proceedings of the Materials Science & Technology 2012 Conference and Exhibition*, Pittsburgh PA, Oct 7-11, 2012.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Member, Executive Committee, Pressure Vessels and Piping Division, American Society of Mechanical Engineers. 2010-present.

Communications Chair, Pressure Vessels and Piping Division, American Society of Mechanical Engineers. 2010-present.

EDITORSHIPS IN PROFESSIONAL JOURNALS

Associate Technical Editor, *Journal of Pressure Vessel Technology*, *Transactions ASME*.

Member of the Editorial Board, Applied Composite Materials – International Journal for the Science and Application of Composite Materials.

RUTLEDGE, JAMES L., Maj,

Assistant Professor of Aerospace Engineering; Department of Aeronautics and Astronautics, AFIT Appointment Date 2011 (AFIT/ENY); BS, Mechanical Engineering, University of Texas at Austin, 2002; MS, Mechanical Engineering, University of Texas at Austin, 2004; PhD, Aeronautical Engineering, Air Force Institute of Technology, 2009. Maj Rutledge's research interests include experimental and computational investigations of gas turbine heat transfer, unsteady fluid mechanics, inverse heat transfer and aerothermodynamics. He has authored several refereed journal and conference publications and was awarded the Rohsenow Prize in 2008 by ASME. Maj Rutledge is a member of Tau Beta Pi, AIAA, and ASME. He is a registered professional engineer in the State of Texas and has deployed to Afghanistan in support of Operation Enduring Freedom. Tel. 937-255-3636 x4734 (DSN 785-3636 x4734), e-mail: James.Rutledge@us.af.mil

SPONSOR FUNDED RESEARCH PROJECTS

“Mechanical Properties and Fatigue Behavior of Unitized Composite Airframe Structures at Elevated Temperatures.” Sponsor: AFRL/RQ. Funding: \$25,000 – Rutledge 90% Polanka 10%.

REFEREED JOURNAL PUBLICATIONS

Rutledge, J.L. and McCall, J.F., “Determination of Time Resolved Heat Transfer Coefficient and Adiabatic Effectiveness Waveforms with Unsteady Film,” *Journal of Turbomachinery*, Vol. 135, Mar 2013.

Rutledge, J.L. and Polanka, M.D., “Achieving a Specific Non-Uniform Heat Flux with an Electrical Heat Flux Plate,” *Journal of Heat Transfer*, Vol. 135, Aug 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Rutledge, J.L., 2013, “Heat Transfer Boundary Condition Waveforms on a Turbine Blade Leading Edge With Unsteady Film Cooling,” GT2013-94587, ASME Turbo Expo 2013, San Antonio, TX, Jun 3-7, 2013.

Rutledge, J.L. and McCall, J.F., 2013, “An Inverse Heat Transfer Approach to Mitigating Sources of Experimental Error in Transient Heat Transfer Experiments,” GT2013-94583, ASME Turbo Expo 2013, San Antonio, TX, Jun 3-7, 2013.

Greiner, N.J., Polanka, M.D., Robertson, J.J., Rutledge, J.L., 2013, “Effect of Variable Properties Within a Reacting Boundary Layer With Film Cooling,” GT2013-94794, ASME Turbo Expo 2013, San Antonio, TX, Jun 3-7, 2013.

SIMMONS, RONALD J., Lt Col,

Assistant Professor of Aeronautical Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2009 (AFIT/ENY); BS, Aeronautical Engineering & BS Astronautical Engineering, United States Air Force Academy, 1988; MS Aeronautical and Astronautical Engineering, Massachusetts Institute of Technology, 1990; PhD, Aerospace Engineering, The Ohio State University, 2009. Lt Col Simmons' research interests include astrodynamics, re-entry dynamics, space propulsion, and turbine propulsion. His dissertation work investigated the optimal design and control of a variable cycle turbine engine with an independently modulated third stream. He is a command pilot with over 4,000 hours in six aircraft, and has also served as a professor of Astronautics at the US Air Force Academy. Tel. 937-255-3636 x4723, email: Ronald.Simmons@afit.edu

SWENSON, ERIC D.,

Associate Professor of Aerospace Engineering, Department of Aeronautics and Astronautics (AFIT/ENY). He received his BS in civil engineering from the Ohio State University in 1988, MS in astronautical engineering from the Air Force Institute of Technology, and PhD in aerospace engineering from the

University at Texas at Austin in 2006. He is a retired Lt Col who in his twenty-five plus years of experience in the Air Force serving as an Astronautical Engineering Professor, Titan Launch Pad Engineer, Civil Engineer, and a Nuclear Measurements Technician. More recently, he has been a key player in AFIT's recent expansion in space-related experimental research including the development of 6U CubeSats, a satellite attitude simulator called SimSat, and various other space experiments. His previous research has focused on solving multi-million degree of freedom finite element models with viscoelastic materials, satellite design and test, damage detection techniques, and system identification through optimization. He is a Technical Area Editor for the Journal of Small Spacecraft and he is a member of Chi Epsilon, SPIE, Tau Beta Pi, and AIAA. Tel. 255-3636x7479, email: Eric.Swenson@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"AFRL/RV-AFIT 2012 MOA Research." Sponsor: AFRL/RV. Funding: \$125,000 – Swenson 25%, Cobb 25%, Black 25%, Wiesel 25%. [CSRA]

"Optimal Targeting Maneuvers." Sponsor: N/A. Funding: \$65,000 – Swenson 34%, Cobb 33%, Simmons 33%. [CSRA]

"Peregrine: Deployable Photon Sieve." Sponsor: DARPA. Funding: \$171,041 – Swenson 40%, Black 25%, Cobb 25%, Rutledge 10%. [CSRA]

"Structural Health Monitoring of Space Structures." Sponsor: AFOSR. Funding: \$25,000 – Swenson 96%, Mall 4%.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Swenson, E.D. "6U Challenges and Advantages," 5th Government CubeSat Technical Exchange Government, San Diego, CA, Apr 2013. [CSRA]

TORVIK, PETER J.,

Professor Emeritus of Aerospace Engineering and Engineering Mechanics, Department of Aeronautics and Astronautics, (AFIT/ENY); BS, University of Minnesota, 1960; MS, University of Minnesota, 1962; PhD, University of Minnesota, 1965; BA, Wright State University, 1980. Professor Torvik is a specialist in theory of elasticity, wave propagation, shock and vibration, impact damage in aircraft systems, laser-material interactions, and aircraft survivability/ vulnerability. His primary research interests include structural dynamics, specifically, damping, impact, and penetration mechanics. Dr. Torvik is the author of over 100 technical papers and reports and some 30 other publications. He served as Head of the Department of Aeronautics and Astronautics, 1980-1990. He is the recipient of the AF Meritorious Civilian Service Award, the AF Exceptional Civilian Service Award, the Outstanding Civilian Career Service Award, USAF, and the John Leland Atwood Award and Medal, AIAA and ASEE. Dr. Torvik is a Fellow of AIAA, a Fellow of the ASME, and a Fellow of Ohio Academy of Science. Tel. 937-255-3636 x4740 (DSN 785-3636 x4740), email: Peter.Torvik@afit.edu

WIESEL, WILLIAM E., Jr.,

Professor of Astronautical Engineering, Department of Aeronautics and Astronautics, AFIT Appointment Date: 1977 (AFIT/ENY); BS, University of Massachusetts, 1970; MS, Harvard University, 1972; PhD, Harvard University, 1974. Dr. Wiesel's research interests include applications of dynamical systems theory to orbital mechanics and astrodynamics, especially KAM theory; estimation and control, planetary astronomy, stability theory, and optimal control. Dr. Wiesel is the author of Spaceflight Dynamics, the leading introductory text on astronautical engineering. He has authored over 40 technical papers and has been a member of the department for 35 years. Tel. 937-255-3636 x4312 (DSN 785-3636 x4312), email: William.Wiesel@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Member of the Board of Directors and Secretary of the Honors Society of Metropolitan Dayton.

5.2. DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING

Access Phone: 937-255-2024, DSN 785-2024

Fax: 937-656-7061, DSN 986-7061

Homepage: <http://www.afil.edu/en/eng/>

5.2.1	<u>DOCTORAL DISSERTATIONS</u>	66
5.2.2	<u>MASTER'S THESES</u>	66
5.2.3	<u>GRADUATE RESEARCH PAPERS</u>	70
5.2.4	<u>FACULTY BIOGRAPHIES & RESEARCH OUTPUT</u>	71

5.2.1. DOCTORAL DISSERTATIONS

- BUSCHELMAN, ERIC A., *A Nonparametric Approach to Segmentation of Ladar Images*. AFIT/DEE/ENG/12-07. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFOSR.
- DERRISO, MARK M., *Machine Conscious Architecture for State Exploitation and Decision Making*. AFIT/ENG/DS/13M-01. Faculty Advisor: Dr. Richard A. Raines. Sponsor: AFRL/R.Y. [CCR]
- HACK, DANIEL E., *Passive MIMO Radar Detection*. AFIT/ENG/DS/13S-07. Faculty Advisor: Dr. Michael A. Saville. Sponsor: AFRL/R.Y.
- HAKER, MARSHALL E., *Modeling the Effects of the Local Environment on a Received GNSS Signal*. AFIT/DEE/ENG/12-11. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/R.Y. [ANT]
- HARMER, PAUL K., *Development of a Learning from Signals Classifier for Cognitive Software Defined Radio Applications*. AFIT/ENG/DS/13M-02. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/R.Y. [CCR]
- KAUFFMAN, KYLE J., *Radar Based Navigation in Unknown Terrain*. AFIT/ENG/DS/12-03. Faculty Advisor: Dr. John F. Raquet. Sponsor: DAGSI. [ANT]
- KIMBALL, WILLIAM B., *A Formal Approach to Vulnerability Discovery in Binary Programs*. AFIT/ENG/DS/13J-03. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: N/A. [CCR]
- KING, AMANDA S., *Development of a Model and Localization Algorithm for Received Signal Strength-Based Geolocation*. AFIT/ENG/DS/13J-02. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A. [ANT]
- MONTMINY, DAVID P., *Enhancing Electromagnetic Side-Channel Analysis in an Operational Environment*. AFIT/ENG/DS/13S-01. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: N/A. [CCR]
- NEFF, BRIAN J., *Improving Multiple Surface Range Estimation of a 3-Dimensional FLASH LADAR in the Presence of Atmospheric Turbulence*. AFIT/ENG/DS/13J-01. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: AFOSR.
- NOEL, GEORGE E., *Image Annotation and Topic Extraction Using Super-Word Latent Dirichlet Allocation*. AFIT/ENG/DS/13S-03. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RI. [CCR]
- PAUL, JASON V., *Metamaterial Structure Design Optimization: A Study of the Cylindrical Cloak*. AFIT/ENG/DS/13M-04. Faculty Advisor: Dr. Peter J. Collins. Sponsor: NRTF.
- REISING, DONALD R., *Exploitation of RF-DNA for Device Classification and Verification Using GRLVQI Processing*. AFIT/ENG/DS/12-04. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/R.Y. [CCR]
- STONE, SAMUEL J., *Radio Frequency Based Programmable Logic Controller Anomaly Detection*. AFIT/ENG/DS/13S-05. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/R.Y. [CCR]

5.2.2. MASTER'S THESES

- ACERSON, BRIAN S., *Simulation and Fabrication of Mathematically Designed Electromagnetic Structures*. AFIT/ENG/13M-01. Faculty Advisor: Dr. Peter J. Collins. Sponsor: N/A.
- ARCHER, MICHAEL D., *High Frequency Magnetic Field Direction Finding Using MGL-S8A B-dot Sensors*. AFIT/ENG/13M-02. Faculty Advisor: Lt Col Geoffrey A. Akers. Sponsor: AFRL/R.Y.

ARMIJOS, JULIO D., *Complex Signal Processing in the RF Domain*. AFIT/ENG/13M-03. Faculty Advisor: Dr. Mary Y. Lanzerotti. Sponsor: AFRL/RV.

BAILEY, KYLE O., *Computer Based Behavioral Biometric Authentication via Multi-Modal Fusion*. AFIT/ENG/13M-04. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFOSR.

BARTO, WILLIAM C., *Classification of Encrypted Web Traffic Using Machine Learning Algorithms*. AFIT/ENG/13J-11. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: Global Velocity. [CCR]

BASNIGHT, ZACHARY H., *Firmware Counterfeiting and Modification Attacks on Programmable Logic Controllers*. AFIT/ENG/13M-06. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

BECKER, DAVID J., *Laser Illuminated Imaging: Multiframe Beam Tilt Tracking and Deconvolution Algorithm*. AFIT/ENG/13M-07. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: AFRL/RD.

BLAZEVIC, STJEPAN, *Photoacoustic Detection of Terahertz Radiation for Chemical Sensing and Imaging Applications*. AFIT/ENG/13M-08. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

BOOTH, MATTHEW B., *Verification of Commercial SatCom Device Identities Using Radio Frequency-Distinct Native Attributes (RF-DNA)*. AFIT/ENG/13M-09. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV. [CCR]

BRISTOW, JONATHAN S., *Learning Enterprise Malware Triage from Automatic Dynamic Analysis*. AFIT/ENG/13M-10. Faculty Advisor: Maj Thomas E. Dube. Sponsor: DHS. [CCR]

CAPRA, SALVATORE, *Cloud Computing Trace Characterization and Synthetic Workload Generation*. AFIT/ENG/13M-11. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: N/A.

DANNER, BRENT L., *Characterization of Metal-Insulator-Transition (MIT) Phase Change Materials (PCM) for Reconfigurable Components, Circuits, and Systems*. AFIT/ENG/13M-12. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: AFOSR.

DEAN, JAMES W., *Real-time Heading Estimation using Perspective Features*. AFIT/ENG/13M-13. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RW. [ANT]

DRINKWATER, RYAN L., *Estimating and Measuring Application Latency of Typical Distributed Interactive Simulation (DIS) - Based Simulation Architecture*. AFIT/ENG/13M-14. Faculty Advisor: Dr. Douglas D. Hodson. Sponsor: OSD.

DUBENDORFER, CLAY K., *Using RF-DNA Fingerprints to Discriminate ZigBee Devices in an Operational Environment*. AFIT/ENG/13M-15. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV. [CCR]

DUNLAP, STEPHEN J., *Timing-Based Side Channel Analysis for Anomaly Detection in the Industrial Control System Environment*. AFIT/ENG/13J-01. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

EMGE, JAMES E., *Cognitive Augmentation for Network Defense*. AFIT/ENG/13M-16. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RI. [ANT]

FINKE, CINDY D., *Format Preserving Encryption: Evaluating FFX for Use Within the NextGen Air Traffic Control System*. AFIT/ENG/13M-17. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: ACC/AFNORTH.

FLATLEY, BRIDGET N., *Rootkit Detection Using a Cross-View Clean Boot Method*. AFIT/ENG/13M-18. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A.

GIBSON, ALAN S., *Applied Hypergame Theory for Network Defense*. AFIT/ENG/13J-02. Faculty Advisor: Dr. Gary B. Lamont. Sponsor: AFRL/R.Y.

GUPTILL, JOHN B., *Examining Application Components to Reveal Android Malware*. AFIT/ENG/13M-19. Faculty Advisor: Maj Thomas E. Dube. Sponsor: N/A.

HADJIS, JOHN A., *Automatic Modulation Classification of Common Communication and Pulse Compression Radar Waveforms Using Cyclic Features*. AFIT/ENG/13M-20. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFRL/R.Y.

HANNAN, JAMES C., *Mobile Network Defense Interface for Cyber Defense and Situational Awareness*. AFIT/ENG/13M-21. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: AFRL/RI. [ANT]

HARDIN, JOSHUA A., *Information Encoding on a Pseudo Random Noise Radar Waveform*. AFIT/ENG/13M-22. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RW. [ANT]

HARVEY, EVAN P., *All-Optical Logic Gates and Wavelength Conversion via the Injection-Locking of a Fabry-Perot Semiconductor Laser*. AFIT/ENG/13M-23. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/R.Y.

HEARLE, JOHN A., *Side-Channel Analysis of Subscriber Identity Modules*. AFIT/ENG/13J-03. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: DHS. [CCR]

HILL, JONATHAN D., *Improving Bandwidth Utilization in a 1 Tbps Airborne MIMO Communications Downlink*. AFIT/ENG/13M-25. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A.

IVERSON, PRESTON B., *Evaluating Change Management Processes and Systems Using ITIL and Business Process Modeling*. AFIT/ENG/13M-26. Faculty Advisor: Dr. Robert F. Mills. Sponsor: 24 AF/26 NOS. [CCR]

JAROMIN, ROBERT M., *Emulation of Industrial Control Field Device Protocols*. AFIT/ENG/13M-27. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS. [CCR]

KNIGHT, MICHAEL P., *Development of a Response Planner Using the UCT Algorithm for Cyber Defense*. AFIT/ENG/13M-28. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: AFRL/RI.

KUHAR, BENJAMIN J., *RF Emitter Tracking and Intent Assessment*. AFIT/ENG/13M-29. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFRL/R.Y. [ANT]

LEHMAN, NATHAN J., *Constitutive Parameter Measurement Using Double Ridge Waveguide*. AFIT/ENG/13M-30. Faculty Advisor: Dr. Michael J. Havrilla. Sponsor: AFRL/R.Y.

LINGG, HEATHER A., *Dynamic Network Topologies*. AFIT/ENG/13J-04. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFOSR. [ANT]

LORENZINI, PHILIP E., *Sensitivity Analysis of an Automated Calibration Routine for Airborne Cameras*. AFIT/ENG/13M-51. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/R.Y. [ANT]

MAKSIM, STEPHEN D., *A Study of Dim Object Detection for the Space Surveillance Telescope*. AFIT/ENG/13M-32. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: DARPA.

MARIETTA, DANIEL A., *Error Characterization of Vision-Aided Navigation Systems*. AFIT/ENG/13M-33. Faculty Advisor: Lt Col Kenneth A. Fisher. Sponsor: AFRL/R.Y. [ANT]

MCLEAN, RYAN K., *An Architecture for Coexistence with Multiple Users in Frequency Hopping Cognitive Radio Networks*. AFIT/ENG/13M-34. Faculty Advisor: Maj Mark D. Silvius. Sponsor: AFRL/R.Y.

MOREHART, RYAN A., *Evaluating the Effectiveness of IP Hopping via an Address Routing Gateway*. AFIT/ENG/13M-35. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: N/A.

MYERS, AARON T., *The Miniaturization of the AFIT Random Noise Radar*. AFIT/ENG/13M-37. Faculty Advisor: Dr. Peter J. Collins. Sponsor: N/A. [ANT]

NORVELL, ELIZABETH K., *Spectral Detection of Acute Mental Stress with VIS-SWIR Hyperspectral Imagery*. AFIT/ENG/13M-38. Faculty Advisor: Lt Col Jeffrey D. Clark. Sponsor: 711 HPW/RH.

OTIS, JEREMY R., *Evaluation of Cyber Sensors for Enhancing Situational Awareness in the ICS Environment*. AFIT/ENG/13J-06. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS. [CCR]

PUTNAM, ISAAC B., *Atmospheric Impact on Long Pulse Laser Detection and Ranging (LADAR) Systems*. AFIT/ENG/13M-39. Faculty Advisor: Dr. Stephen C. Cain. Sponsor: AFRL/RD.

QUARMYNE, JAMES O., *Inertial Navigation System Aiding Using Vision*. AFIT/ENG/13M-40. Faculty Advisor: Dr. Meir Pachter. Sponsor: AFRL/RW. [ANT]

RAULERSON, EVAN L., *Modeling Cyber Situational Awareness through Data Fusion*. AFIT/ENG/13M-41. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RI. [ANT]

RUNCO, ANTHONY M., *Detection Optimization of the Progressive Multi-Channel Correlation Algorithm Used in Infrasound Nuclear Treaty Monitoring*. AFIT/ENG/13M-42. Faculty Advisor: Lt Col James A. Louthain. Sponsor: AFTAC.

RYAN, DAVID A., *A Multi Agent System for Flow-Based Intrusion Detection*. AFIT/ENG/13M-43. Faculty Advisor: Dr. Gary B. Lamont. Sponsor: AFRL/RV.

SAWYER, MELISSA A., *Material Characterization Using Passive Multispectral Polarimetric Imagery*. AFIT/ENG/13M-44. Faculty Advisor: Maj Milo W. Hyde, IV. Sponsor: AFOSR.

SCHMIDT, JOHN R., *Characterization and Dynamic Analysis of Long-Cavity Multi-Section Gain-Levered Quantum-Dot Lasers*. AFIT/ENG/13M-45. Faculty Advisor: Maj Michael C. Pochet. Sponsor: AFRL/RV.

SICKENDICK, KARL A., *File Carving and Malware Identification Algorithms Applied to Firmware Reverse Engineering*. AFIT/ENG/13M-46. Faculty Advisor: Maj Thomas E. Dube. Sponsor: DHS. [CCR]

SMITH, BRETT A., *Kernel Extended Real-Valued Negative Selection Algorithm (KERNISA)*. AFIT/ENG/13J-07. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: ASEE.

STEVENS, SEAN R., *Metrics for Emitter Selection for Multistatic Synthetic Aperture Radar*. AFIT/ENG/13S-03. Faculty Advisor: Dr. Julie A. Jackson. Sponsor: AFRL/RV.

TOLER, BENJAMIN F., *Novel Test Fixture for Characterizing Microcontacts: Performance and Reliability*. AFIT/ENG/13M-47. Faculty Advisor: Dr. Ronald A. Coutu, Jr. Sponsor: N/A.

VRANICAR, TREVOR J., *Airborne Network Data Availability Using Peer to Peer Database Replication on a Distributed Hash Table*. AFIT/ENG/13M-48. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RV. [ANT]

WELLER-FAHY, DAVID J., *Network Intrusion Dataset Assessment*. AFIT/ENG/13M-49. Faculty Advisor: Dr. Brett J. Borghetti. Sponsor: 711 HPW/RH. [ANT & CCR]

WILSON, JOSHUA M., *The Design and Analysis of Electrically Large Custom-Shaped Reflector Antennas*. AFIT/ENG/13J-08. Faculty Advisor: Dr. Andrew J. Terzuoli. Sponsor: N/A.

WILSON, RUSSELL D., IV, *Adaptations and Analysis of the AFIT Noise Radar Network for Indoor Navigation*. AFIT/ENG/13M-50. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RW. [ANT]

ZIEGLER, JOSHUA S., *The Dynamic Multi-Objective Multi-Vehicle Covering Tour Problem*. AFIT/ENG/13J-09. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RV.

5.2.3. GRADUATE RESEARCH PAPERS

CLARK, RONALD J., *Implementing an Integrated Network Defense Construct*. AFIT/ENG/GRP/13J-01. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: N/A. [CCR]

RUETER, BRADLEY A., *Cyberspace Integration with the Air Operations Center*. AFIT/ENG/GRP/13J-02. Faculty Advisor: Dr. Robert F. Mills. Sponsor: 24 AF/A3. [CCR]

5.2.4. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

AKERS, GEOFFREY A., Lt Col,

Deputy Department Head and Assistant Professor, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2009 (AFIT/ENG), BS, Electrical Engineering, Missouri University of Science and Technology, 1996; MS, Electrical Engineering, Air Force Institute of Technology, 2000; PhD, University of Kansas, 2009. His research interests include space-time adaptive processing, synthetic, aperture radar, noise radar technology, digital beamforming, and direction finding. Tel. 937-255-3636 x4659 (DSN 785-3636 x 4659), email: Geoffrey.Akers@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Multi-Band SAR Automated Detection Support.” Sponsor: AFLCMC. Funding: \$51,000 – Akers 85%, Jackson 15%.

“RF Modeling.” Sponsor: AFRL/RY. Funding: \$45,000.

REFEREED CONFERENCE PAPERS ON THE BASIS OF FULL PAPER REVIEW

T. Thorson, G. Akers (presenter), and P. Collins, “Modeling the AFIT Random Noise Radar,” *IET International Radar Conference*, ISBN 978-1-84919-676-5, 23-25 Oct 2012.

C. Corbin, G. Akers, "Analysis of angle of arrival estimation at HF using an ensemble of structurally integrated antennas," *SPIE Signal Processing, Sensor Fusion, and Target Recognition Conference XXII*, SPIE Proceedings Vol. 8745, DOI: 10.1117/12.2016149, Jun 2013.

J. Stringer, G. Akers, G. Lamont, "Design and Performance of an Environmental Estimation Algorithm with Application to ES Receivers," *Tri-Service Radar Symposium*, Jul 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Technical Reviewer: *IEEE Journal of Selected Topics in Signal Processing*, *IEEE Transactions on Aerospace and Electronic Systems* and *2013 IEEE Radar Conference Proceedings*.

Technical evaluator for AORD proposals--Evaluated two proposals from international universities.

ENG Deputy Department Head (Jun 2012 – May 2013).

Civilian Student Working Group (May 2012 – May 2013).

Coordinator for Low Observables, Radar, and Electromagnetic (LORE) programs’ seminar, bringing outside speakers to AFIT—Research leaders from AFIT, AFRL, and Arizona State (Jul - Oct 2012).

Worked with AFRL, OSU, and Miami University to develop series of radar lectures and experiments (2012).

Participated in IEEE Senior Membership Drive (2012).

BALDWIN, RUSTY O.,

Professor of Computer Engineering, Research Director, Center for Cyberspace Research, Department of Electrical and Computer Engineering, AFIT Appointment Date: 1999 (AFIT/ENG), BSEE, New Mexico State University, 1987; MS, Computer Engineering, Air Force Institute of Technology, 1992; PhD, Virginia Polytechnic Institute and State University, 1999. His research interests include computer communication networks, embedded and wireless networking, computer security, side channel analysis, and reconfigurable

computing systems, and military medical networks. Tel. 937-255-6565 x4445 (DSN 785-6565 x4445), email: Rusty.Baldwin@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

“Federal Cyber Service: Scholarship for Service (SFS).” Sponsor: NSF. Funding: \$283,010. [CCR]

“Increasing the Federal Cybersecurity Workforce through Graduate Education and Research at AFIT.” Sponsor: NSF. Funding: \$459,489 – Baldwin 50%, Raines 50%. [CCR]

“NSA Cyber Center of Excellence: Summer Intern Program Cyber Ops Curriculum.” Sponsor: NSA. Funding: \$66,450. [CCR]

SPONSOR FUNDED RESEARCH PROJECTS

“Joint Integrated Electronic Health Record (iEHR) Initial Operating Capability Support.” Sponsor: TRICARE. Funding: \$655,000. [CCR]

“Technical Support, Jiseki Development.” Sponsor: NSA. Funding: \$191,434 – Baldwin 75%, Raines 25%. [CCR]

REFEREED JOURNAL PUBLICATIONS

G. Degirmenci, J. P. Kharoufeh, and R. O. Baldwin, “On the Performance Evaluation of Query-Based Wireless Sensor Networks,” *Performance Evaluation*, Vol. 70, No. 2, pp. 124-147, Feb 2013. [CCR]

D. P. Montminy, R. O. Baldwin, M. A. Temple, and E. D. Laspe, “Improving Cross-Device Attacks using Zero-Mean Unit-Variance Normalization,” *Journal of Cryptographic Engineering*, Vol. 3, No. 2, pp. 99-110, 2013. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

W. M. S. Stout and R. O. Baldwin, “Network Performance Impact of Access Control Policies in Tactical Wireless Networks,” 2012 IEEE Military Communications Conference (MILCOM 2012), Orlando, FL, Oct 2012, 1-6. [CCR]

H. Patel and R. O. Baldwin, “Differential Power Analysis Using Wavelet Decomposition,” 2012 IEEE Military Communications Conference (MILCOM 2012), Orlando, FL, Oct 2012, 1-5. [CCR]

H. Patel and R. O. Baldwin, “GPU Accelerated Differential Power Analysis,” 2012 IEEE Military Communications Conference (MILCOM 2012), Orlando, FL, Oct 2012, 1-5. [CCR]

PATENTS

W. E. Cobb, M. A. Temple, R. O. Baldwin, E. W. Garcia, and E. D. Laspe, “A Method for the Intrinsic Physical Layer Authentication of Integrated Circuits,” Provisional Patent #13/663,051, 29 Oct 2012. [CCR]

W. Kimball and R. O. Baldwin, “Emulation-Based Software Protection,” Patent #8,285,987, 9 Oct 2012. [CCR]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

ENG PhD Coordinator.

Doctoral Council President.

BORGHETTI, BRETT J.,

Assistant Professor of Computer Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2008; (AFIT/ENG), BSEE, Worcester Polytechnic Institute (WPI), 1992; MSCS, Air
Force Institute of Technology, 1996; PhD, Computer Science, University of Minnesota, 2006. His research
interests include machine learning, autonomous agents, and multi-agent systems. Tel. 937-255-3636 x4612
(DSN 785-3636 x4612), email: Brett.Borghetti@afit.edu

REFEREED JOURNAL PUBLICATIONS

Sodemann, A.A., Ross, M.P., and Borghetti, B.J., "A Review of Anomaly Detection in Automated
Surveillance," IEEE Transactions on System, Man, and Cybernetics Part C, Vol.. 42, No. 6, Nov 2012, pp
1257-1272. DOI 10.1109/TSMCC.2012.2215319.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AFIT Combined Federal Campaign Representative 2012 (Aug-Dec).

AFIT Learning Community Organizer for Research Productivity Group – 8 members (Feb – Aug 2013).

Technical Mentor for University of Dayton Senior Design Project: SCENE I (5 students, Sep 2012-Apr
2013).

Technical Mentor for University of Dayton Senior Design Project: SCENE II (5 students, Sep 2013-Apr
2014).

BUTTS, JONATHAN W., Maj,

Division Chief and Assistant Professor of Computer Science, Department of Electrical and Computer
Engineering, AFIT Appointment Date: 2010 (AFIT/ENG); BS, Computer Science, Chapman University,
2001; MS, Information Assurance, Air Force Institute of Technology, 2006; PhD, Computer Science,
University of Tulsa, 2010. His research interests include critical infrastructure protection, information
assurance, telecommunication systems security, strategic communications and operationalizing military
actions in cyberspace. Tel. 937-255-3636 x4332 (DSN 785-3636x4332), email: Jonathan.Butts@afit.edu

REFEREED JOURNAL PUBLICATIONS

C. Finke, J. Butts, R. Mills, M. Grimaila, "Enhancing the security of aircraft surveillance in the next
generation air traffic control system," Int'l. Journal of Critical Infrastructure Protection, Vol. 6(1), pp. 3-11,
Mar 2013. [CCR]

J. Butts, M. Rice and S. Sheno, An Adversarial Model for Cyber Attack on Control Protocols, Journal of
Defense Modeling and Simulation, Vol. 9(3), pp. 243-255, 2012. [CCR]

D. Magazu, R. Mills, J. Butts, D. Robinson, "Exploiting Automatic Dependent Surveillance-Broadcast via
False Target Injection," Journal of Aviation and Aerospace Perspectives, Vol. 2(2), pp. 5-19, Fall 2012.
[CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Z. Basnight, J. Butts, J. Lopez, T. Dube, "Analysis of Programmable Logic Controller Firmware for Threat
Assessment and Forensic Investigation," 8th Int'l. Conf. on Information Warfare and Security, Denver,
CO, USA, 25-26 Mar 2013. [CCR]

D. Berman, J. Butts, "Towards characterization of cyber attacks on industrial control systems: Emulating field
devices using Gumstix technology," 5th Int'l Symposium on Resilient Control Systems, Salt Lake City,
UT, USA, 14-16, 2012. [CCR]

- C. Finke, J. Butts, R. Mills, M. Grimalia, "Evaluation of a Cryptographic Security Scheme for Air Traffic Control's Next Generation Upgrade," 8th Int'l. Conf. on Information Warfare and Security, Denver, CO, USA, 25-26 Mar 2013. [CCR]
- C. Arnold, J. Butts, K. Thirunarayan, "Strategies for Combating Sophisticated Attacks," 8th International Conference on Information Warfare and Security, Denver, CO, USA, 25-26 Mar 2013. [CCR]
- C. Finke, J. Butts, R. Mills, "ADS-B Encryption: Ensuring Confidentiality in the Friendly Skies," 8th Annual Cyber Security and Information Intelligence Research Workshop, Oak Ridge, TN, USA, 8-10 Jan 2013. [CCR]
- R. Jaromin, B. Mullins, J. Butts, "Applications and Design of Industrial Control Emulators," 7th Annual IFIP WG 11.10 International Conference on Critical Infrastructure Protection, Washington, DC, USA, 18-20 Mar 2013. [CCR]
- R. Clark, J. Butts, R. Mills, "Implementing an Integrated Network Defense Construct," 18th International Command and Control Research and Technology Symposium, Fairfax, VA, USA, 19-21 Jun 2013. [CCR]
- B. Rueter, R. Mills, J. Butts, "Cyberspace Integration within the Air Operations Center," 18th International Command and Control Research and Technology Symposium, Fairfax, VA, USA, 19-21 Jun 2013. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

- J. Otis, D. Berman, J. Butts, J. Lopez, "ICS logging solution for network-based attacks using Gumistix technology," 2013 SPIE Defense, Security + Sensing Conference, Baltimore, MD, USA, 29 Apr - 3 May. [CCR]

BOOKS AND CHAPTERS IN BOOKS

- J. Butts and S. Shenoi (Editors): Critical Infrastructure Protection VI, Springer, New York, 2012. [CCR]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Computer Science and Engineering Division Chief.

Chair of the IFIP Working Group 11.10 on Critical Infrastructure Protection.

Committee member for Air Force CyberVision 2025.

Program Committee Member IFIP WG 11.9 Conference.

ICSJWG Program Advisory Subcommittee Member.

International Symposium on Resilient Control Systems Committee Member.

CAIN, STEPHEN C.,

Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
 Appointment Date: 2003 (AFIT/ENG), BSEE, University of Notre Dame, 1992; MSEE, Michigan Technological University, 1994; PhD, University of Dayton, 2001. His research interests include electro-optics, remote sensing, and signal processing. Tel. 937-255-3636 x4625 (DSN 785-3636 x4625), email: Stephen.Cain@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Multi-Frame Fusion of 2D and 3D FLASH LADAR for Simultaneously Improving Both Spatial and Range Resolution." Sponsor: AFOSR. Funding: \$24,282 – Cain 50%, Martin, R. 50%.

REFEREED JOURNAL PAPERS

Brian J. Neff, Quentin D. McManus, Stephen C. Cain and Richard K. Martin, "Image deblurring and near-real-time atmospheric seeing estimation through the employment of convergence of variance," *The Journal of Applied Remote Sensing*, Vol. 7, DOI 073504, Sep 20, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Isaac Putnam and Stephen Cain, "Modeling a Temporally Evolving Atmosphere with Zernike Polynomials," AMOS technical conference, Maui, HI, 2012.

Stephen Maksim, Chris Zingarelli and Stephen Cain, "A Comparison Between a Non-Linear and a Linear Gaussian Statistical Detector for Detecting Dim Satellites," AMOS technical conference, Maui, HI, 2012.

David Becker and Stephen Cain, "Laser Illuminated Imaging: Multiframe Beam Tilt Tracking and Deconvolution Algorithm," AMOS technical conference, Maui, HI, 2012.

Stephen Cain, "Multi-Frame Fusion of Undersampled 3-D Imagery," Proceedings of the SPIE Vol. 8520: *Unconventional Imaging and Wavefront Sensing*, San Diego, CA, 2012.

Brian J. Neff and Stephen C. Cain, "Image restoration technique for motion-compensated frame averaged data collected by 3D flash LADAR imaging system," Proceedings of the SPIE Vol. 8520: *Unconventional Imaging and Wavefront Sensing*, San Diego, CA, 2012.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

EN, Member of the CDRC 2010 – Present.

ENG, Chair of the Department Curriculum Committee.

Program Committee for SPIE's Unconventional Imaging and Wave Front Sensing Conference.

CLARK, JEFFREY D., Lt Col,

Deputy Department Head and Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2011 (AFIT/ENG), BS, Electrical Engineering, University of Arkansas, 1994; MS, Electrical Engineering, Air Force Institute of Technology, 2006; PhD, Electrical Engineering, Air Force Institute of Technology, 2011. His research interests include artificial intelligence, machine learning, hyperspectral remote sensing. Tel. 937-255-3636 x4614 (DSN 785-3636 x4614), email: Jeffrey.Clark@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Skin and Textile Identification Using Hyperspectral Imagery." Sponsor: 711 HPW/RH. Funding: \$60,000.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Asif Mehmood, Jeffrey Clark, and Wesam Sakla, "Skin-Based Hyperspectral Dismount Detection Using Sparse Representation," *Fifth Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing, IEEE WHISPERS*, Gainesville Florida, 25-28 Jun 2013, pp 1-4.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

A. Mehmood, J. Clark and W. Sakla, "Unmixing Hyperspectral Skin Data using Non-Negative Matrix Factorization," Proc. Of SPIE, Apr 2013, Baltimore, MD.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

EN IT Working Group Representative.

EN Civilian Student Working Group Representative.

EN Academic Review Board Representative.

COLLINS, PETER J.,

Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2006 (AFIT/ENG); BA, Bethel College, MN, 1985; BSEE, University of Minnesota, 1985; MSEE, Air Force Institute of Technology, 1990; PhD, Air Force Institute of Technology, 1996. His research interests include low observables, computational electromagnetics, radar cross section metrology, remote sensing, and electromagnetic material design and analysis. He is a senior member of the IEEE. Tel. 937-255-3636 x7256 (DSN 785-3636 x7256), email: Peter.Collins@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Enabling Technologies for Radar Scattering Measurements.” Sponsor: AFRL/RY. Funding: \$113,671.

“Technical Support: RCS Metrology.” Sponsor: 46 TG. Funding: \$35,000.

REFEREED JOURNAL PUBLICATIONS

J. Paul, P. Collins and R. Coutu, “A New Look at Azimuthal Wave Propagation Constants of an N-Layered Dielectric Coated PEC Cylinder,” *IEEE Transactions on Antennas and Propagation*, Vol. 61, No. 5, pp. 2727-2734, May 2013.

D. Langley, R. Coutu, Jr. and P. Collins, “Using Inductance as a Tuning Parameter for RF Meta-atoms,” *Nano-Micro Letter*, Vol. 4 No. 2, pp.103-109, 2012.

E. Moore, D. Langley, M. Jussaume, L. Rederus, C. Lundell, R. Coutu, P. Collins and L. Starman, “SRRs Embedded with MEMS Cantilevers to Enable Electrostatic Tuning of the Resonant Frequency,” *Experimental Mechanics*, Vol. 52, No. 4, pp. 395-403, 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

T. Thorson, G. Akers, and P. Collins, “Modeling the AFIT Random Noise Radar,” *Proceedings of the Radar 2012 International Conference on Radar Systems*, Glasgow, UK, Oct 22-25, 2012. [ANT]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

R. Wilson and P. Collins, “AFIT Noise Radar Network for Indoor Navigation,” *ION COUNT 7th Annual Informational Meeting*, Columbus OH, 9-10 Apr 2013. [ANT]

B. Acerson, J. Hardin, R. Wilson, and P. Collins, “Noise Radar Measurements,” *14th RCS Measurement Facilities Certification Conference*, Broomfield, CO, 2012. [ANT]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

EN Doctoral Council Member.

ENG Doctoral Program Coordinator.

4ILY (Low Observables) Curriculum Chair (ENG/ENP joint program).

Utilized AFIT CCR power conditioning unit scheduled for DRMO to improve power in ACER (bldg 168). Protects current and future \$2.3M radar system. Reutilization saved DOD ~\$30,000.

ALICE CubeSat Payload Lead (Delivered to Launch Provider Jun 2013/Scheduled Launch Dec 2013).

Briefed Dayton Area Plastic Modelers on RCS Measurements. Enlisted the membership in assembling 31 models for AFIT's RCS range (ACER). Providing ACER outreach tours/demonstration later this CY.

AMTA Board of Directors Member/AMTA Secretary.

RCS Executive Committee.

ISO 17025 Migration Committee.

AMTA 2013 Host Committee/Technical Committee/RCS Metrology Session Chair/Student Day Chair.

RadarCon 2014 Technical Committee/Session Chair.

Patent Application: P. Collins, S. Faris, and C. McNeely, May 2013, "Radar-Frequency Metamaterial Measurement and Characterization Apparatus.

COUTU, RONALD, A., Jr.,

Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 12 Aug 2008 (AFIT/ENG); BSEE, University of Massachusetts, Amherst, 1993; MSEE, California Polytechnic (CalPoly) State University, San Luis Obispo, 1995; PhD, Air Force Institute of Technology, 2004. His research interests include microelectronics, microelectromechanical systems (MEMS) and MEMS fabrication with emphasis on micro electrical contacts, phase change materials, tunable metamaterials and terahertz components. His areas of expertise include design, fabrication, and test of micro/nano devices. He is a member of Tau Beta Pi, Eta Kappa Nu, SEM, SPIE, MRS and a Senior Member of the IEEE. Tel. 937-255-3636 x7230 (DSN 785-3636 x7230), email: Ronald.Coutu@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Characterizing Metal-Insulator-Transition (MIT) Phase-Change Materials (PCM) for Micro-Switching Elements." Sponsor: AFOSR. Funding: \$29,008.

"Photoacoustic Detection of Terahertz Radiation for Chemical Sensing and Imaging Applications." Sponsor: AFOSR. Funding: \$30,935.

"Pyroelectric Characterization of Aluminum Nitride (AlN) Thin Films." Sponsor: AFRL/Ry. Funding: \$24,282 – Coutu 80%, Langley 20%.

REFEREED JOURNAL PUBLICATIONS

Starman, L.A., and Coutu, Jr., R.A., "Using Micro-Raman Spectroscopy to Assess MEMS Si/SiO₂ Membranes Exhibiting Negative Spring Constant Behavior," *Journal of Experimental Mechanics*, Digital Object Identifier (DOI) 10.1007/s11340-012-9656-7, pp 1-12, 2012.

Christiansen, B.D, Heller, E.R., Coutu, Jr., R.A., Ventury, R., and Shealy, J.B., "A Very Robust AlGaIn/GaN HEMT Technology to High Forward Gate Bias and Current," *Journal of Hindawi Publishing Corp, Active and Passive Electronic Components*, Vol. 2012, Article ID 493239, pp 1-4, 2012.

Langley, D., Coutu, Jr., R.A. and Collins, P.J., "Using Inductance as a Tuning Parameter for RF Meta-atoms," *Nano Micro Letters*, Vol. 4 (2), pp 103-109, 2012, Digital Object Identifier (DOI) 10.3786/nml.vi2.p103-109.

Paul, J.V., Collins, P.J. and Coutu, Jr., R.A., "A New Look at Azimuthal Wave Propagation Constants of an Layered Dielectric Coated PEC Cylinder," *IEEE Trans on Antennas and Propagation*, Digital Object Identifier (DOI) 10.1109/TAP.2013.2242820, Vol. 61, No. 5, pp 2727-2734, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Danner, B.L. and Coutu, Jr., R.A., "Using MIT PCM as RF Microswitches," *Proceedings of Eurosensors XXVI*, Vol. 47, pp. 830-834, Krakow, Poland, 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Langley, D., Coutu, Jr., R.A. and Collins, P.J., "A Frequency Selective Surface Design Fabricated with Tunable RF Meta-atoms," *The 14th International Symposium on MEMS and Nanotechnology, SEM Annual Conference*, IL, Vol. 5, pp. 57-62, Lombard, IL, 3-5 Jun, 2013.

Glauvitz, N.E., Blazevec, S., Coutu, Jr., R.A., Langley, D., Kistler, M., Medvedev, I.R., and Petkie, D.T., "MEMS Cantilever Sensor Design for Photoacoustic Detection of Terahertz Radiation," *The 14th International Symposium on MEMS and Nanotechnology, SEM Annual Conference*, IL, Vol. 5, pp. 73-79, Lombard, IL, 3-5 Jun, 2013.

Toler, B.F., Danner, B.L., Langley, D. and Coutu, Jr., R.A. "Unique Fabrication Method for Novel MEMS Micro Contact Structure," *The 14th International Symposium on MEMS and Nanotechnology, SEM Annual Conf*, IL, Vol. 5, pp. 49-55, Lombard, IL, 3-5 Jun, 2013.

Deibel, J.A., Jones, H.R., Fosnight, A., Best, E., Starman, L.A. and Coutu, Jr., R.A., "Flexible Terahertz Metamaterials for Frequency Selective Surfaces," *The 14th International Symposium on MEMS and Nanotechnology, SEM Annual Conference*, IL, Vol. 5, pp. 129-134, Lombard, IL, 3-5 Jun, 2013. (Invited Paper)

Glauvitz, N.E., Coutu, Jr., R.A., Kistler, M.N., Hamilton, R.F., Petkie, D.T. and Medvedev, I.R., "A MEMS Cantilever-based Photoacoustic Detector of Terahertz Radiation for Chemical Sensing," *International Symposium on Molecular Spectroscopy 68th Meeting*, Columbus, OH, (presentation only), 17-21 Jun, 2013.

PATENTS

Ostrow, Scott A., II and Coutu, Ronald A., Jr, "Novel MEMS Fabrication Processes Based on SU-8 Masking Layers," Patent No. 8,574,821, Issued 5 Nov 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Director, AFIT Class 1000 Cleanroom.

EN Chief Faculty Advisor, Tau Beta Pi (TBP).

ENG Chairman, Microelectronics, Microelectromechanical systems (MEMS) and Nanotechnology Curriculum.

ENG Faulty Advisor, Eta Kappa Nu (HKN).

Session Chair, Device Fabrication I, The 14th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics (SEM) Annual Conference.

Session Organizer, Devices and Fabrication, The 14th International Symposium on MEMS and Nanotechnology, Society of Experimental Mechanics (SEM) Annual Conference.

The 59th IEEE Holm Conference on Electrical Contacts:
Technical Program Committee Member.
Technical Paper Review Coordinator, Micro-Electrical Contacts.
Technical Paper Reviewer.

Text Book Reviewer, Introduction to Sensors and Actuators, IET Press.

Technical Paper Reviewer for 12 journals: New Journal of Physics, ASME Journal of Tribology, Elsevier Journal of Sensors and Actuators A: Physical, Tribology International, Institute of Physics Journal of Smart Materials and Structures, Nano-Micro Letters, IEEE Transactions on Industrial Electronics, IOP Journal of Micromechanics and Microengineering, Nanoscale Research Letters, IEEE Transactions on Components, Packaging and Manufacturing Technology, IEEE Electron Device Letters, IEEE/ASME Journal of Microelectromechanical Systems.

On-going collaboration with:
Penn State University – PCM micromachined test structures.
Auburn University – Micro-contacts modeling.

Organized a Microelectronics Seminar for AFRL researchers to visit AFIT and brief their AFRL research projects.

DAVIS, NATHANIEL J., IV,

Professor and Head, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2005 (AFIT/ENG), BSEE, Virginia Polytechnic Institute and State University, 1976, MSEE, Virginia Polytechnic Institute and State University, 1977, PhD, Purdue University, 1985. His research interests include computer communications networks, cyber operations, and large scale computer architectures. Dr. Davis is a senior member of the IEEE and a member of the Sigma Xi, Eta Kappa Nu, and Tau Beta Pi honorary societies. Tel. 937-255-3636 x7218 (DSN 785-3636 x7218), email: Nathaniel.Davis@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Continued service as an IEEE-selected ABET accreditation and assessment Program Evaluator for electrical and computer engineering programs. Completed visit for the computer engineering program at Binghamton University in Sep 2012.

Member, AFIT search committees for Dean, Graduate School of Engineering and Management, and AFIT Vice Chancellor, Jun 2013 – present.

Member, Air Force Review Panel for Challenge Projects, Capability Applications Projects, and Dedicated HPC Projects in high performance computing. The panel assessed proposals for funding to support high performance computing needs across the Air Force. Proposals included the design and purchase of large-scale parallel computing hardware and software systems as well as proposals for computing time on existing major shared computing resources. Nov 2012 to Mar 2013.

Member, Education and Training Team, AF Chief Scientist's Global Horizons Study. Identify, forecast, and capitalize on global trends in education and training that will impact the Air Force in the next decade. Jan 2013 to May 2013.

Law Offices of O'Melveny and Myers, San Francisco, CA, Aug 2011 – May 2013. MicroUnity Systems Engineering Inc, v. Apple Inc., et.al., Case No. 02:10-cv-91-DF Consolidated with Case No. 02:10-cv-185-TJW-CE. Provided expert witness information for the joint defense group, to include expert reports and deposition testimony, for use in patent infringement litigation dealing with microprocessors and microprocessor system design. The case was prosecuted in United States District Court for the Eastern District of Texas, Marshall Division, and settled out of court in May 2013.

Law Offices of McDermott, Will, and Emery, Chicago, IL, Aug 2012 – Sep 2012. Innovative Communications Technologies Inc. v. OOVVOO LLC, Case No. 2:12-cv-8-RGD-DEM. Provided initial expert witness information for the defendants for use in patent infringement litigation dealing with the computer architectures and network infrastructures supporting teleconferencing applications. The case was prosecuted in the United States District Court for the Eastern District of Virginia, Norfolk Division, and settled out of court in Oct 2012.

DUBE, THOMAS E., Maj,

Assistant Professor of Computer Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2011 (AFIT/ENG); BCE, Computer Engineering, Auburn University, 2000; MS, Information Assurance, Air Force Institute of Technology, 2006; PhD, Computer Engineering, Air Force Institute of Technology, 2011. His research interests include cyberspace operations, malware analysis, reverse engineering software engineering, and machine learning. Maj Dube is a member of the IEEE and a member of Eta Kappa Nu and Tau Beta Pi honorary societies. Tel. 937-255-3636 x4613 (DSN 785-3636x4613), email: Thomas.Dube@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Z. Basnight, J. Butts, J. Lopez, T. Dube, “Analysis of Programmable Logic Controller Firmware for Threat Assessment and Forensic Investigation,” 8th Int’l. Conf. on Information Warfare and Security, Denver, CO, USA, 25-26 Mar 2013. [CCR]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Graduate of Cyber Operations (GCO) Curriculum Chair.

FISHER, KENNETH A., Lt Col,

Deputy Director, Advanced Navigation Technology (ANT) Center; Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2009 (AFIT/ENG), BSEE Ohio Northern University, 1997; MSEE, Air Force Institute of Technology, 1999; PhD, Air Force Institute of Technology, 2005. His research interests include stochastic estimation and control, information theory, navigation using signals of opportunity, and cooperative navigation. He is a member of ION, IEEE, Tau Beta Pi, and Eta Kappa Nu.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Marietta, D., K. Fisher, and C. Taylor, “Error Characterization of Extended Kalman Filter Based Image-Aided Navigation,” 2013 International Technical Meeting of the ION, San Diego, CA, Jan 2013. [ANT]

Marietta, D., K. Fisher, and C. Taylor, “Error Characterization of Extended Kalman Filter Based Image-Aided Navigation,” 2012 Dayton Engineering and Science Symposium, Dayton, Ohio, Oct 2012. [ANT]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Test Review Board (TRB) / Safety Review Board (SRB) Member—active board member of AFIT’s first TRB/SRB for UAV flight operations.

Member of AFIT’s Institutional Advancement Committee.

Guidance, Navigation, and Control Curriculum Chair.

Session Chair: ION Pacific PNT 2013 (Apr 2013), DESS 2012 (Oct 2012).

Technical Reviewer: IEEE ACC 2013, IEEE CDC 2013.

Served as Subject Matter Expert to DARPA on All Source Positioning and Navigation Program.

Source Selection Board Member: AFRL/RV SBIR on Alternative Navigation (MAGIC), AFRL/RV SBIR on Navigation Uncertainty Estimation, GPS Wing on BAA on Alternative Navigation, SW Defined Radios.

Advisor to the TPS Selection Board held at AFPC.

SME to F-35 and F-22 SPOs.

GOODMAN, SCOTT A., Maj,

Instructor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2009 (AFIT/ENG); BSEE, University of Kansas, 1997; MSEE, Air Force Institute of Technology, 2001. Currently pursuing a PhD with The Ohio State University. His research interests include antenna theory, radar cross section theory, antenna and radar cross section measurement methodologies and electromagnetic theory. Tel. 937-255-3636 x4683 (DSN 785-3636 x4683), email: Scott.Goodman@afit.edu

HAKER, MARSHALL E., Maj,

Assistant Professor, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2012 (AFIT/ENG); BS, Electrical and Computer Engineering, The Ohio State University, 2002; MS Electrical Engineering, 2007. His research interests involve signal processing for radionavigation and geolocation, including robust GNSS-based signaling and navigation warfare. Tel 937-255-3636 x4603 (DSN 785-3636 x4603), email: Marshall.Haker@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

ENG faculty/staff representative for Combined Federal Campaign (CFC).

ENG military faculty pipeline manager.

Treasurer for the Dayton Section of the Institute of Navigation.

HAVRILLA, MICHAEL J.,

Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2002 (AFIT/ENG); BS, Michigan State University, 1987, MSEE, Michigan State University, 1989, PhD, Michigan State University, 2001. His research interests include electromagnetic theory, guided wave theory and applications, electromagnetics of complex media, material characterization, low observables, electromagnetic scattering and antenna theory. He is a member of HKN and Sigma Xi, Senior member of the IEEE, and a Full Member of the International Union of Radio Science-Commission B. Tel. 937-255-3636 x4582 (DSN 785-3636 x4582), email: Michael.Havrilla@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Material Measurement Laboratory Research.” Sponsor: AFRL/RV. Funding: \$283,077.

REFEREED JOURNAL PUBLICATIONS

M. Havrilla, “Scalar potential depolarizing dyad artifact for a uniaxial medium,” Progress in Electromagnetic Research, Vol. 134, pp. 151-168, Feb 2013.

M. Hyde, M. Havrilla, A. Bogle, E. Rothwell and G. Dester, “An Improved Two-Layer Method for Nondestructively Characterizing Magnetic Sheet Materials Using a Single Rectangular Waveguide Probe,” Electromagnetics, Vol. 32, No. 7, pp. 411-425, Oct 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

J. Tang, B. Crowgey, O. Tuncer, E. Rothwell, S. Balasubramaniam, L. Kempel and M. Havrilla, “Characterization of Biaxial Materials using a Partially Filled Rectangular Waveguide,” Antenna Measurement Techniques Association Conference Proceedings, pp. 1-6, Seattle, Washington, Oct 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

M. Havrilla, A. Bogle, M. Hyde and E. Rothwell, "Electromagnetic material characterization of a curved conductor-backed media using an NDE microstrip probe," ENDE Electromagnetic Nondestructive Evaluation Conference Abstracts, pp. 61-62, Rio De Janeiro, Brazil, 2012.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Chair, AFIT/ENG Electromagnetics Curriculum.

Member: AFIT/EN Academic Standards Committee (ASC), AFIT/EN Institutional Research Director Search Committee, AFIT/ENG Promotion and Tenure Committee, AFIT/ENG Executive Committee.

Invited Session Chair, "Advances in Electromagnetic NDE Techniques for Materials Evaluation," Electromagnetic Nondestructive Evaluation Conference, Rio de Janeiro, Brazil, 2012.

Reviewer, "Asian Office of Aerospace Research and Development (AOARD) Proposal," 2012.

Session Chair, "Material Design, Measurement and Instrumentation," Antenna Measurement Techniques Association (AMTA) Conference, Seattle, WA, Oct 2012.

Member, Technical Committee, Antenna Measurement Techniques Association (AMTA) Conference, Seattle, WA, Oct 2012.

Reviewer for various electromagnetic journals including IEEE Transactions on Antennas and Propagation, Journal of Electromagnetic Waves and Applications and IEEE Transactions on Microwave Theory and Techniques.

Consultant, Air Force Research Laboratory's (AFRL) Materials and Sensors Directorates.

HODSON, DOUGLAS D.,

Assistant Professor of Software Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2011 (AFIT/ENG); BS, Physics, Wright State University, 1985; MS, Electro-Optics, University of Dayton, 1987; MBA, University of Dayton, 1999; PhD, Computer Engineering, AFIT, 2009. His research interests include real-time distributed simulation architectures for training, test and analysis, networks, design patterns for modeling radar and infrared effects. His research interest also includes the modeling and simulation of Quantum Key Distribution protocols. Tel. 937-255-3636 x4719, email: Douglas.Hodson@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Support of AFNES/RIPR Autonomy Effort." Sponsor: AFRL/RQ. Funding: \$30,000 – Hodson 50%, Peterson 50%. [ANT]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Associate Editor for Journal of Defense Modeling and Simulation (JDMS).

Guest Editor for Journal of Defense Modeling and Simulation (JDMS) special issue titled "The Art and Science of Using Live-Virtual-Constructive Simulations for Analysis and Test." Expected publication date: Fall 2014.

Nominated to Adjunct membership into Wright State University's graduate faculty.

HOPKINSON, KENNETH M.,

Associate Professor, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2004 (AFIT/ENG), BSCS, Rensselaer Polytechnic Institute, 1997, MSCS, Cornell University, 2002, PhD, Cornell University, 2004. His research interests include wired and wireless networking, fault tolerant and reliable distributed systems, middleware, operating systems, net-centric warfare, network security, cloud computing, and the use of networks to enhance critical use of infrastructures. Dr. Hopkinson is a senior member of the IEEE a senior member of the ACM, and a member of the Upsilon Pi Epsilon and Eta Kappa Nu honorary societies. Tel. 937-255-3636 x4579 (DSN 785-3636 x4579), email: Kenneth.Hopkinson@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“A Cognitive and Context Aware Approach to Networking in Mobile Environments.” Sponsor: AFOSR. Funding: \$28,084.

“Benchmarking the Maestro Processor.” Sponsor: N/A. Funding: \$151,171.

“Using Cognitive Radios to Enhance Communication Capabilities.” Sponsor: AS&T. Funding: \$100,000 – Hopkinson 51%, Silvius 49%.

REFEREED JOURNAL PUBLICATIONS

Reynolds, M.B., Hulce, D.R., Hopkinson, K.M., Oxley, M.E., Mullins, B.E., On-line Service Placement and Performance Control, *IEEE Transactions on Network and Service Management*, Vol. 10, Issue 3, Sep 2013, pp. 326-339.

Ross, K.J., Hopkinson, K.M., Pachter, M., Using a Distributed Agent-Based Communication Enabled Special Protection System to Enhance Smart Grid Security, *IEEE Transactions on Smart Grid*, Vol. 4, Issue 2, Jun 2013, pp. 1216-1224.

Tong, X., Wang, X., Wang, R., Huang, F., Dong, X., Hopkinson, K.M., Song, G., The Study of a Regional Decentralized Peer-to-Peer Negotiation-Based Wide-Area Backup Protection Multi-Agent System, *IEEE Transactions on Smart Grid*, Vol. 4, Issue 2, Jun 2013, pp. 1197-1206.

Haught, J.D., Hopkinson, K.M., Hemmes, J.M., The Modeling and Simulation of a Network Controller Based on Router Queue-Size Predictions, *Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, Vol. 10, Issue 2, Apr 2013, pp. 105-115.

Harmon, D.F., Reynolds, M.B., Graham, S.R., Hopkinson, K.M., Integrating Disruption Prone Links Into Reliable Networks – A TCP Friendly Approach, *IET Communications*, Vol. 6, Issue 12, 2012, pp. 1702-1709.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

McLean, R.K., Silvius, M.D., Hopkinson, K.M., Method for Evaluating k-Means Clustering for Increased Reliability in Cognitive Radio Networks, *IEEE Sixth International Conference on Software Security and Reliability (SERE)*, 18-20 Jun 2013, Washington, D.C., USA, pp. 1-10.

Borowski, J.F., Hopkinson, K.M., Humphries, J.W., Borghetti, B.J., Reputation-Based Trust for a Cooperative Agent Based Backup Protection Scheme, *IEEE General Power Meeting*, 22-27 Jul 2012, San Diego, CA, USA, pp. 1.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

McLean, R.K., Flatley, B.N., Silvius, M.D., Hopkinson, K.M., FPGA-Based RF Spectrum Merging and Adaptive Hopset Selection, *IEEE Aerospace Conference*, 2-9 Mar 2013, Big Sky, Montana, USA, Article No. 2391, pp. 1-8.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

2012 Director, AFIT EN Awards Committee (Until Oct 2013).

2012-2013 Program Chair, Graduate MS Computer Engineering (GCE) Degree Program.

IEEE Reviewer: 2013 RF and Microwave Conference, 2013 Conference on Wireless Sensors, 2013 Symposium on Wireless Telecommunications Applications, 2013 Symposium on Computers and Informatics, 2013 Transactions on Parallel and Distributed Systems, 2012-2013 Transactions on Communications, 2012-2013 Transactions on Smart Grid, 2012-2013 Transactions on Power Delivery, 2012 Asia-Pacific Conference on Applied Electromagnetics, 2012 Third IEEE Conference on Smart Grid Communications Symposium on Wide-Area Monitoring, Protection, and Control.

Reviewer: 2013 IARIA 4th International Conference on Cloud Computing, GRIDS, and Virtualization, 2013 IARIA 5th International Conference on Advanced Cognitive Technologies and Applications, 2013 National Science Foundation, 2013 International Journal of Information Technology and Decision Making, 2013 SCIENCEDOMAIN British Journal of Mathematics and Computer Science.

HOUPIS, CONSTANTINE H.,

Professor Emeritus of Electrical Engineering, Department of Electrical and Computer Engineering, (AFIT/ENG); BS, University of Illinois, 1947; MS, University of Illinois, 1948; PhD, University of Wyoming, 1971. His research interests include guidance and control of aerospace vehicles, application of optimal control theory to engineering systems, flight control systems, digital control systems, computational and numerical methods for control systems design, linear and nonlinear control theory, multivariable theory, and quantitative feedback theory. Professor Houpis' has published numerous technical articles and textbooks. He is registered professional engineer and a Fellow of the IEEE. Tel. 937-255-3636 x4615 9 (DSN 785-3636 x4615), email: Constantine.Houpis@afit.edu

HYDE, MILO W., Maj,

Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2010 (AFIT/ENG); BS, Computer Engineering, Georgia Institute of Technology, 2001; MSEE, Air Force Institute of Technology, 2006; PhD, Electrical Engineering, Air Force Institute of Technology, 2010. His research interests include electromagnetic material characterization, optical material characterization, guided-wave theory, scattering, and optics. He is a senior member of IEEE, SPIE, and OSA. Tel. 937-255-3636 x4371 (DSN 785-3636 x4371), email: Milo.Hyde@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Beam Control for Optical Phased Array Weapons.” Sponsor: tOSC. Funding: \$103,125. [CDE]

“Extended Beacons: Modeling, Characterization, & Atmospheric Compensation.” Sponsor: AFOSR. Funding: \$73,000.

“Material Classification/Estimation Using Turbulence-Degraded Polarimetric Imagery with Applications to Space Situational Awareness and Remote Sensing.” Sponsor: AFOSR. Funding: \$11,760.

“Phase Unwrapping Experiments in Strong Turbulence.” Sponsor: AFOSR. Funding: \$68,600. [CDE]

REFEREED JOURNAL PUBLICATIONS

M. W. Hyde IV, M. J. Havrilla, A. E. Bogle, E. J. Rothwell, and G. D. Dester, “An improved two-layer method for nondestructively characterizing magnetic sheet materials using a single rectangular waveguide probe,” *Electromagnetics*, Vol. 32, No. 7, pp. 411-425, 2012.

Santasri Basu, Milo W. Hyde IV, Salvatore J. Cusumano, Michael A. Marciniak, and Steven T. Fiorino, "Examining the validity of using a Gaussian Schell-model source to model the scattering of a fully-coherent Gaussian beam from a rough impedance surface," *Optical Engineering*, Vol. 52, No. 3, 038001 (9 pp.), Mar. 2013.

Milo W. Hyde IV, Santasri Basu, Mark F. Spencer, Salvatore J. Cusumano, and Steven T. Fiorino, "Physical optics solution for the scattering of a partially-coherent wave from a statistically rough material surface," *Optics Express*, Vol. 21, No. 6, pp. 6807-6825, Mar. 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Melissa Sawyer and Milo Hyde, "Material characterization using passive multispectral polarimetric imagery," Proceedings of SPIE (SPIE Optics and Photonics), Vol. 8873, 15 pp., San Diego, CA, 25 – 29 Aug 2013.

Mark Spencer and Milo Hyde, "Phased beam projection from tiled apertures in the presence of turbulence and thermal blooming," Proceedings of SPIE (SPIE Optics and Photonics), Vol. 8877, 15 pp., San Diego, CA, 25 – 29 Aug 2013.

Santasri Basu, Milo W. Hyde IV, Jack E. McCrae, Jr., and Steven T. Fiorino, "Scattering from a rough impedance surface in presence of atmospheric turbulence," Proceedings of SPIE (SPIE Defense, Security, and Sensing), Vol. 8732, 9 pp., Baltimore, MD, 29 Apr – 3 May 2013.

M. W. Hyde IV, S. Basu, S. J. Cusumano, and M. F. Spencer, "Scalar wave solution for the scattering of a partially coherent beam from a statistically rough metallic surface," Proceedings of SPIE (SPIE Optical Systems Design), Vol. 8550, 15 pp., Barcelona, Spain, 26 – 29 Nov 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Michael Steinbock and Milo Hyde, "Reconstruction-dependent tilts when branch points are present," Directed Energy Professional Society (DEPS) Beam Control Conference, p. 13, Monterey, CA, 26 – 30 Aug 2013.

Michael J. Steinbock, Glenn A. Tyler, Nicholas Steinhoff, Milo Hyde, and Steven T. Fiorino, "HiPATSim: high fidelity modular phased array simulation tool," Directed Energy Professional Society (DEPS) Beam Control Conference, p. 16, Monterey, CA, 26 – 30 Aug 2013.

Franklin N. Jose, Jack E. McCrae, Jr., Steven T. Fiorino, Jason E. Wyman, Michael J. Steinbock, Milo W. Hyde IV, and Glenn A. Tyler, "An experimental testbed for phasing an optical array on a remote rough surface," Directed Energy Professional Society (DEPS) Beam Control Conference, p. 16, Monterey, CA, 26 – 30 Aug 2013.

Milo W. Hyde IV and Michael J. Havrilla, "Broadband, nondestructive characterization of PEC-backed materials using a dual-ridged-waveguide probe," URSI National Radio Science Meeting, p. 160, Lake Buena Vista, FL, 7 – 13 Jul 2013.

Santasri Basu, Milo W. Hyde, Jack E. McCrae, and Steven T. Fiorino, "Examining the validity of using a Gaussian Schell-model source to model an extended beacon," Wave Optics of Deep Atmospheric Turbulence MURI Annual Review Meeting, p. 2, Arlington, VA, 27 Jun 2013.

M. Hyde and M. Havrilla, "Broadband material characterization using dual-ridged waveguides," Material Measurement Working Group Conference Proceedings, 1 p., Dayton, OH, 15 – 16 May 2013.

Michael J. Steinbock, Milo W. Hyde, and Jason D. Schmidt, "Simulated adaptive optics performance for a single-path deep turbulence scenario," Directed Energy Professional Society (DEPS) Annual Directed Energy Symposium, p. 35, Albuquerque, NM, 26 – 30 Nov 2012.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

ENG Academic Reviewer.

Session chair for *IEEE Aerospace Conference (AeroConf)*, Big Sky, MT, Mar 2013.

Reviewer of *IEEE Transactions on Instrumentation and Measurement* manuscript “Biaxial permittivity determination for electrically-small material specimens of complex shape using shorted rectangular waveguide measurements,” Aug 2013.

Proposal (LRIR) reviewer for AFOSR/RTB, Jul 2013.

Member: Eta Kappa Nu Honor Society, Tau Beta Pi Honor Society, Antenna Measurement Techniques Association (AMTA), International Society for Optics and Photonics (SPIE), Optical Society of America (OSA), Military Officers Association of America.

Senior Member: IEEE Antennas and Propagation Society, IEEE Electromagnetic Compatibility Society, IEEE Geoscience and Remote Sensing Society, IEEE Instrumentation and Measurement Society, IEEE Microwave Theory and Techniques Society.

AFIT SPIE Student Chapter Faculty Advisor.

JACKSON, JULIE A.,

Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2009 (AFIT/ENG), BS, Electrical Engineering, Wright State University, 2002; MS, Electrical Engineering, The Ohio State University, 2004; PhD, Electrical Engineering, The Ohio State University 2009. Her research interests include electromagnetic and statistical modeling, radar imaging algorithms, and radar signal exploitation. She is a member of IEEE, Eta Kappa Nu, and Tau Beta Pi. Tel. 937-255-3636 x4678 (DSN 785-3636 x4678), email: Julie.Jackson@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Compact Feature Representation of Discriminatory Scattering Phenomenology Extracted from Sparse Aperture 3DSAR Data.” Sponsor: AFOSR. Funding: \$167,000.

“Laboratory Experiments in Support of Passive Bistatic Radar Imaging.” Sponsor: AFRL/RV. Funding: \$5,000.

“Passive Radar Imaging and Signal Exploitation.” Sponsor: AFRL/RV. Funding: \$50,000.

“Polarization-Based Feature Extraction.” Sponsor: AS&T. Funding: \$17,500.

“Structured-Sparsity for Polarimetric Radar Imaging.” Sponsor: AS&T. Funding: \$79,446.

REFEREED JOURNAL PUBLICATIONS

J. Gutierrez del Arroyo and J. A. Jackson, “WiMAX OFDM for Active and Passive SAR Ground Imaging” *IEEE Transactions on Aerospace and Electronic System*, Vol. 49, No. 2, pp. 945-959, Apr 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

J. Gutierrez del Arroyo, J. A. Jackson, and M. Temple, “Receive Signal Processing For OFDM-Based Radar Imaging,” IEEE International Conference on Acoustics, Speech, and Signal Processing, Vancouver, Canada, 26-31 May, 2013.

J. Gutierrez del Arroyo and J. A. Jackson, "Collecting and Processing WiMAX Ground Returns for SAR Imaging," IEEE Radar Conference, Ontario, Canada, 29 Apr – 3 May, 2013, Paper ID 5007, pp. 1-6.

G. B. Hammond and J. A. Jackson, "Canonical Feature Extraction Using Molecule Dictionaries," IEEE Radar Conference, Ontario, Canada, 29 Apr – 3 May, 2013, Paper ID 5092, pp. 1-6.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Nov 2012: Dean's Representative for dissertation defense of Ms. Miriam Poteet (ENC).

Conference Organizing Committee, Liaison to the IEEE Signal Processing Society, 2014 IEEE Radar Conference (hosted by Dayton Chapter of IEEE Aerospace and Electric Systems Society), May 19-23, 2014.

Conference Program Committee and Paper Reviewer, 2013 MSS Tri-Service Radar Symposium.

Technical Program Committee Member (Paper Reviewer), 2013 IEEE Radar Conference.

Session Organizer, AFIT Posters, 2012 Summer Program Review for AFRL Automatic Target Recognition Center held at WSU.

Affiliate Member, IEEE Signal Processing Society Sensor Array and Multichannel Technical Committee.

Wright State University Electrical Engineering Alumni Council.

AFIT/ENG Low Observables, Radar, and Electromagnetics (LORE) group seminar\coordinator.

Technical Reviewer - EURASIP Journal on Advances in Signal Processing, IEEE Systems, Man, and Cybernetics, Part A., IEEE Transactions on Aerospace and Electronic Systems, IEEE Transactions on Geoscience and Remote Sensing, Progress in Electromagnetics Research Journal of Electromagnetic Waves and Applications.

2012: provided consultation to AFRL/RYPX on 3D remote sensing SBIR topic.

KAUFFMAN, KYLE J.,

Research Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2013 (AFIT/ENG); BS, Miami University, 2003; MS, Miami University, 2009; PhD, Air Force Institute of Technology, 2012. Dr. Kauffman's areas of interest include alternative navigation sensors, computational optimization, remote sensing, radar-based navigation, autonomous navigation and control, inertial measurement system integration, large-scale navigation platform development, and navigation using signals of opportunity. Tel. 937-255-3636 x4683 (DSN 785-3636 x4683), email: Kyle.Kauffman@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Hybrid Sensor Fusion for Autonomous Applications." Sponsor: AFOSR. Funding: \$20,766 – Kauffman 75%, Pachter 25%. [ANT]

"UAV Vision-Aided Navigation (UVAN) Demo." Sponsor: AFRL/RYP. Funding: \$285,900 – Kauffman 50%, Raquet 30%, Haker 10%, Woolley 10%. [ANT]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

K. Kauffman, J. Raquet, Y. Morton, D. Garmatyuk, "Experimental Study of Two-channel UWB-OFDM Radar for Indoor Navigation with INS Integration," *Proc. ION GNSS*, Nashville, TN, Sept 2013. [ANT]

Kauffman, K and J. Raquet, "Self-Building World Model for Magnetometer-based Navigation Using a Distributed Sensor Network," *Proceedings of ION GNSS+-2013*, Nashville, TN, 2013. [ANT]

BOOKS AND CHAPTERS IN BOOKS

Garmatyuk, D., K. Kauffman, J. Raquet, Y. Morton, "Multifunctional Software-Defined Radio Sensors for Detection, Imaging, and Navigation," *Low Power Emerging Wireless Technologies*, ed. R. Mahmoudi and K. Iniewski, CRC Press, pp. 99-115, Feb 2013. [ANT]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

"Self-Building World Model for Magnetometer-based Navigation Using a Distributed Sensor Network," *ION GNSS+ 2013 FOUCO-only session*, Nashville, TN, Sept 2013. [ANT]

Reviewer: IEEE Transactions on Aerospace and Electronic Systems.

LAMONT, GARY B.,

Professor in the Department of Electrical and Computer Engineering, AFIT Appointment Date: 1970 (AFIT/ENG), BS of Physics, 1961; MSEE, 1967, PhD, 1970; University of Minnesota. He teaches courses in computer science and computer engineering. His research interests include: evolutionary computation, artificial immune systems, intrusion and anomaly detection, information security, parallel and distributed computation, combinatorial optimization problems (single objective and multi-objective), software engineering, digital signal processing, and intelligent and distributed control. He has advised many MS and PhD students in these disciplines. Dr. Lamont has authored several textbooks (Multi-Objective EAs, Computer Control), various book chapters as well as numerous papers. Dr. Lamont was also an engineering systems analyst for the Honeywell Aerospace Division for 6 years. He is a member of IEEE (senior member) ACM, ASEE, SIAM, Tau Beta Pi and Eta Kappa Nu. Tel. 937-255-3636 x4718 (DSN 937-785-3636 x4718, email: Gary.Lamont@afit.edu)

REFEREED CONFERENCE PAPERSON THE BASIS OF FULL PAPER REVIEW

Radar Phase-Coded Waveform Design using Multi-Objective evolutionary Algorithms, IEEE Congress on Evolutionary Computation (CEC), Brisbane, Australia, 12-15 Jul, 2012, (authors: Jeremy Stringer, Gary Lamont, and Geoffrey Akers).

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Technical Papers Co-Chair, IEEE National Aerospace and Electronics Conference (NAECON), Dayton, OH, Jul, 2008, 2009, 2010, 2011, 2012, and 2014

Member, program committee: IEEE Congress on Evolutionary Computation (CEC), Genetic and Evolutionary Computation Conference (GECCO), Conference on Evolutionary Multi-Criterion Optimization (EMO), Int'l Conf. on Artificial Immune Systems (ICARIS), Conference on Evolutionary Multi-Criterion Opt. (EMO).

Reviewer: IEEE Transactions on Evolutionary Computing, MIT Journal on Evolutionary Computation.

LANGLEY, DERRICK, Capt,

Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2011 (AFIT/ENG), BS, Electrical Engineering, University of Central Florida, 2003; MS, Electrical Engineering, Wright State University, 2007. PhD, Air Force Institute of Technology, 2012. His research interests include microelectronics, microelectromechanical systems (MEMS), nanotechnology, optics and metamaterials. His areas of expertise include design, fabrication and testing of micro/nano devices. He is a member of SPIE, Eta Kappa Nu and SEM. Tel. 937-255-3636 x6165 (DSN 785-3636 x6165), email: Derrick.Langley@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“3D Photolithography and Molding of Microdevices.” Sponsor: AFRL/R.Y. Funding: \$15,288 – Langley 80%, Coutu 20%.

“Tunable Meta-Atoms for RF Metamaterials.” Sponsor: AFOSR. Funding: \$18,248.

REFERRED JOURNAL PUBLICATIONS

“Topography from Topology: Photoinduced Surface Features Generated in Liquid Crystal Networks.” McConney, M. E., Martinez, A., Tondiglia, V. P., Lee, K. M., Langley, D., Smalyukh, I. I., White, T. J., *Advanced Materials*, published online 21 Jul 2013, DOI: 10.1002/adma.201301891.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

“Developing Best Practices for an Undergraduate STEM Summer Research Program in a Government Institution through a Higher Education Partnership”: Lanzerotti, M. Y., Drennan, J., Varga, M., Creighton, S. J., Langley, D., Cahill, D. L., *120th American Society for Engineering Education Annual Conference & Exposition*, Accepted 4 Apr 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

“Unique Fabrication Method for Novel MEMS Micro-contact Structure”: Toler, B., Danner, B., Langley, D., Coutu R. A., *Society of Experimental Mechanics– SEM Annual Conference and Exposition on Experimental and Applied Mechanics 2013*, Lombard IL, 2-5 Jun 2013.

“A Frequency Selective Surface Design Fabricated with Tunable RF Meta-atoms”: Langley, D., Coutu, R. A., Collins, P. J., *Society of Experimental Mechanics– SEM Annual Conference and Exposition on Experimental and Applied Mechanics 2013*, Lombard IL, 2-5 Jun 2013.

“Flexible Terahertz Metamaterials for Frequency Selective Surfaces”: Deibel, J. A., Jones, H. R., Fosnight, A., Shaver, R., Best, E., Langley, D., Starman, L. A., Coutu, R. A., *Society of Experimental Mechanics– SEM Annual Conference and Exposition on Experimental and Applied Mechanics 2013*, Lombard IL, 2-5 Jun 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewer for Journal of Physics D: Applied Physics.

Coordinated with the AFIT SPIE Student Chapter to provide a STEM demonstrations and background on engineering careers to fifth and sixth grade boys at Rosa Parks School, Dayton Ohio.

LANZEROTTI, MARY Y.,

Associate Professor of Computer Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2011 (AFIT/ENG), AB, Harvard University, 1989; MPhil, University of Cambridge (UK), 1991; MS Cornell University, 1994; PhD, Cornell University, 1997. Her research interests include VLSI design and analysis. She is a member of the IEEE (Senior Member), IEEE Press Editorial Board (elected member), ASEE, APS Committee on Education, CUR, and Phi Beta Kappa. She is Editor-in-Chief of the IEEE Solid-State Circuits Magazine and completed ABET Program Evaluator training. She holds four U.S. patents. Tel. 937-255-3636 x4442 (DSN 785-3636 x4442), email: Mary.Lanzerotti@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

“In the Footsteps of Katherine Wright: Promoting STEM Women through LEADER (Launching Equity in the Academy across the Dayton Entrepreneurial Region).” Sponsor: NSF. Funding: \$27,000.

SPONSOR FUNDED RESEARCH PROJECTS

“Technical Support: Complex Signal Processing in the RF Domain.” Sponsor: AFRL/R.Y. Funding: \$45,442 – Lanzerotti 60%, Martin, R. 20%, Temple 20%.

“Technical Support: Research and Development in Integrated Circuits.” Sponsor: AFRL/R.Y. Funding: \$25,000.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

“Developing Best Practices for an Undergraduate STEM Summer Research Program in a Government Institution through a Higher Education Partnership,” J. Drennan, M. Lanzerotti, S. Creighton, D. Langley, M. Varga, D. Cahill, 2013 Annual Meeting of the American Society for Engineering Education (ASEE), Atlanta, GA, 23-26 Jun 2013, pp. 1-16.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

“High-Speed Tunable Filters for Agile Radio Frequency Receivers,” J. Armijos, M. Lanzerotti, M. Silvius, M. Temple, R. Martin, C. Cerny, D. Ovenshire, V. Fisher, *2013 Government Microcircuit Applications and Critical Technology Conference (GOMACTech-13)*, Las Vegas, NV, 11-15 Mar 2013. A poster was also shown on 14 Mar 2013 (peer-reviewed).

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Curriculum Chair for Digital Engineering.

ABET Electrical Engineering Program evaluator on an ABET accreditation evaluation team.

IEEE *Solid-State Circuits* Editor-in-Chief, IEEE Press Editorial Board elected member, Technical Activities Board member (TAB).

Reviewer for 2013 ASEE Annual Meeting.

National Science Foundation Proposal Review panel member (invited 2013).

Society Member: IEEE Solid-State Circuits, Photonics, Women in Engineering, American Physical Society (APS).

Member: APS Forum on Industrial and Applied Physics (FIAP), American Association for the Advancement of Science (AAAS), Phi Beta Kappa.

Educational Testing Service (ETS) Advanced Placement (AP) Physics Reader.

LAVIERS, KENNARD R., Maj,

Assistant Professor of Computer Science, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2011 (AFIT/ENG), BSCS, University of Texas at El Paso, 2000; MSCS, Air Force Institute of Technology, 2004; PhD, University of Central Florida, 2011. His research interests include artificial intelligence, multi-agent learning, and opponent modeling. Tel. 937-255-3636 x4395 (DSN 785-3636 x4395), email: Kennard.Laviers@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Sensor Detection Using Mobile Phone Networks.” Sponsor: AFSPC. Funding: \$20,000 – Laviers 51%, Hopkinson 49%.

LOUTHAIN, JAMES A., Lt Col,

Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date 2012 (AFIT/ENG), BS, Electrical Engineering, University of Portland, 1991; MS,
Electrical Engineering, Air Force Institute of Technology, 1997; PhD, Air Force Institute of Technology,
2008. His research interests include electronic warfare, infrasound detection signal processing, free-space
optical communication, atmospheric turbulence compensation, and electro-optic tracking. He is a member of
the Tau Beta Pi, Eta Kappa Nu, and the Optical Society of America. Tel. 937-255-3636 x4620 (DSN 785-
3636 x4620), email: James.Louthain@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Runco, Louthain, Clauter, “Optimizing Infrasound PMCC Detection Using Maximum Likelihood and
Receiver Operating Characteristic Curve Analysis,” Comprehensive Nuclear Test Ban Treaty Organization
(CTBTO) Science and Technology (SnT) 2013 biannual Conference, Vienna Austria, 20 Jun 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewed a book for publication from SciTech Publishing - *Radar & Electronic Warfare Principles: From
Novice to Specialist*.

Committee member for the 51st National Junior Science and Humanities Symposium (JSHS) held at the
Dayton Convention Center on 1-5 May 2013.

Provided consulting and technical evaluations for the Advanced Components for the Electronic Warfare
(ACE) DOD-level research initiative.

MARTIN, RICHARD K.,

Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2004 (AFIT/ENG), dual BS, Electrical Engineering and Physics, University of Maryland,
1999; MS, Electrical Engineering, Cornell University, 2001; PhD, Electrical Engineering, Cornell University,
2004. His research interests include source localization, navigation, radio tomographic imaging, and 3D laser
radar imaging. Tel. 937-255-3636 x4625 (DSN 785-3636 x4625), email: Richard.Martin@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Distributed TDOA-Based Source Localization.” Sponsor: AFOSR. Funding: \$23,350 – Martin, R. 50%,
Fisher 50%. [ANT]

“Joint SIGINT-IMINT Position Tracking.” Sponsor: AS&T. Funding: \$46,896 – Martin, R. 80%, Sambora
20%. [ANT]

“Physical Modeling of Radio Tomographic Imaging.” Sponsor: AFOSR. Funding: \$21,852.

“Signal Processing Support for Temporally Multiplexed Spectropolarimetric LADAR with Signal Tagging.”
Sponsor: AFRL/RW. Funding: \$18,543.

REFEREED JOURNAL PUBLICATIONS

R. K. Martin, A. S. King, J. Pennington, R. W. Thomas, R. Lenahan, and C. Lawyer, “Modeling and
Mitigating Noise and Nuisance Parameters in Received Signal Strength Positioning,” *IEEE Transactions
on Signal Processing*, Vol. 60, No. 10, Oct 2012, pp. 5451-5463. [ANT]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

R. P. S. Inglis, T. O. Walker, III, C. R. Anderson, R. K. Martin, and R. W. Thomas, "A Secure WSN for Roadside Surveillance using RTI," in *Proc. 6th Int'l. Conf. Signal Processing and Communication Systems*, Gold Coast, Australia, 12-16 Dec 2012, 8 pages.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

J. D. Armijos, M. Y. Lanzerotti, M. D. Silvius, M. A. Temple, R. K. Martin, C. L. Cerny, D. Ovenshire, and V. Fisher, "High-Speed Tunable Filters for Agile Radio Frequency Receivers," in *Proc. Government Microcircuit Applications & Critical Technology Conference (GOMACTech)*, Las Vegas, NV, 11-14 Mar 2013, 3 pages.

R. Sundaram, R. K. Martin, and C. R. Anderson, "Regularization in Radio Tomographic Imaging," in *Proc. SPIE Defense, Security, and Sensing 2013*, Baltimore, MD, 29 Apr – 03 May 2013, 9 pages.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

EN Faculty Council Academic Resources Committee (ARC); Committee Chair and ENG representative.

ENG Graduate Elec. Eng. (GE) Program Chair.

Associate Editor for *IEEE Signal Processing Letters*, 30 Oct 2012 – present.

Guest Editor for special issue of the *IEEE Journal of Selected Topics in Signal Processing*, on Non-Cooperative Localization Networks.

Conference session chair for session on Sensor Networks at *The IEEE Workshop on Statistical Signal Processing*, Ann Arbor, MI, 2012.

Peer reviewer for 12 journal papers and 3 conference papers.

Organized a booth at TechFest, a local technology expo providing STEM outreach to high school students.

MCTASNEY, ROBERT J., LTC,

Assistant Professor of Computer Engineering, AFIT Appointment Date: 1 Mar 2012 (AFIT/ENG), BS, Electrical Engineering, Texas A&M University, 1987; MS, Electrical Engineering, University of Colorado at Boulder, 1997; PhD, Electrical Engineering, University of Colorado at Boulder, 2008. His research interests include wireless mesh networking, software-defined radio, cognitive radio, embedded systems applications, robotics, and reconfigurable computing. Tel. 937-255-3636 x4460 (DSN 785-3636 x4460), e-mail: Robert.Mctasney@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Attended and completed Industrial Control Systems Cyber Security Advanced Training conducted by the Control Systems Security Program U.S. Department of Homeland Security.

Active member of Dayton Diode, a local hackerspace in Dayton, Ohio.

MILLS, ROBERT F.,

Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2003 (AFIT/ENG), BS, Electrical Engineering, Montana State University, 1983; MS, Electrical Engineering, AFIT, 1987; PhD, Electrical Engineering, University of Kansas, 1994. His research interests include network management and security, cyber operations and warfare, insider threat mitigation, and electronic warfare. He is a Senior Member of the IEEE and is a member of the Eta Kappa Nu and Tau Beta Pi honor societies. Tel. 937-255-3636 x4527 (DSN 785-3636 x4527), email: Robert.Mills@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Cognitive Electronic Warfare.” Sponsor: AFRL/RY. Funding: \$50,000. [CCR]

REFEREED JOURNAL PUBLICATIONS

Bryant, A., Mills, R., Grimaila, M., and Peterson, G. “Top-level goals in reverse engineering executable software,” *Journal of Information Warfare*, Vol. 12:1, May 2013, pp 32-43. [CCR]

Finke, C., Butts, J., Mills, R., and Grimaila, M. “Enhancing the security of aircraft surveillance in the next generation air traffic control system,” *International Journal of Critical Infrastructure Protection*, available online 20 Feb 2013, pp, 1-20, <http://dx.doi.org/10.1016/j.ijcip.2013.02.001>. [CCR]

Magazu, D., Mills, R.F., Butts, J.W., and Robinson, D.J., “Exploiting Automatic Dependent Surveillance-Broadcast via False Target Injection,” *Journal of Aviation and Aerospace Perspectives*, Vol. 2(2), pp. 5-19, Fall 2012. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Rueter, B., Mills, R.F., and Butts, J. “Cyberspace Integration within the Air Operations Center,” International Command and Control Research and Technology Symposium (ICCRTS), Alexandria, Virginia, 19-21 Jun 2013. [CCR]

Clark, R., Butts, J., and Mills, R.F., “Implementing an Integrated Network Defense Construct,” International Command and Control Research and Technology Symposium (ICCRTS), Alexandria, Virginia, 19-21 Jun 2013. [CCR]

Bryant, A., Mills, R., Grimaila, M., and Peterson, G. “Investigating Human Factors Considerations in Reverse Engineering Executable Software,” 8th International Conference on Information Warfare and Security (ICIW 2013), pp. 16-23, Denver CO, 25-26 Mar 2013. [CCR]

Finke, C., Butts, J., Mills, R., and Grimaila, M. “Evaluation of Cryptographic Security Schemes for Air Traffic Control’s Next Generation Upgrade,” 8th International Conference on Information Warfare and Security (ICIW 2013), pp. 259-264, Denver CO, 25-26 Mar 2013. [CCR]

Finke, C., Butts, J., and Mills, R., “ADS-B Encryption: Ensuring Confidentiality in the Friendly Skies,” Proceedings of the Cyber Security and Information Intelligence Research Workshop (CSIIRW 2013, Oak Ridge National Laboratory, Oak Ridge, TN, Jan 8-13, 2013. [CCR]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AFIT Survey Control Panel.

Human Subjects Research Review Panel / Exempt Determination Official.

Curriculum Chair and Faculty Advisor, IDE Cyber Warfare program.

Program committee and referee, International Conference on Cyber Warfare and Security (ICWS) – formally known as the International Conference on Information Warfare and Security (ICIW).

Organized and chaired mini-track on “Human Factors and Cyberspace Operations,” International Conference on Information Warfare and Security (ICIW), Mar 2013.

Technical reviewer: 2012 IEEE Military Communications Conference.

Working with Dept of Transportation Inspector General's office on a technical audit of the Automatic Dependent Surveillance-Broadcast (ADS-B) system which is part of the FAA's Next Generation Air Traffic Control system.

MULLINS, BARRY E.,

Associate Professor of Computer Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2004 (AFIT/ENG), BS Computer Engineering (cum laude), University of Evansville, 1983; MS Computer Engineering, Air Force Institute of Technology, 1987; PhD (Electrical Engineering), Virginia Polytechnic Institute and State University, 1997. His research interests include cyber operations, malware analysis, reverse code engineering, computer/network security, SCADA (supervisory control and data acquisition) security, computer communication networks, embedded (sensor) and wireless networking, and reconfigurable computing systems. Tel. 937-255-3636 x7979 (DSN 785-3636 x7979), email:

Barry.Mullins@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

"IASP Tuition and Resource Support for the AFIT Center for Cyberspace Research (CCR)." Sponsor: NIETP. Funding: \$19,665 – Mullins 50%, Raines 50%. [CCR]

SPONSOR FUNDED RESEARCH PROJECTS

"Development and Implementation of a Testbed for Research and Analysis of Malware." Sponsor: DHS. Funding: \$225,000 – Mullins 20%, Humpheries 20%, Butts 20%, Robinson 20%, Raines 20%. [CCR]

REFEREED JOURNAL PUBLICATIONS

D. R. Karrels, G. L. Peterson and B. E. Mullins, "Large-scale cooperative task distribution on peer-to-peer networks," *Web Intelligence and Agent Systems*, Vol. 11, No. 1, 2013, pp. 67-79. [CCR]

B. E. Mullins, "Developing Cyber Warriors from Computer Engineers et al.," *American Society for Engineering Education (ASEE) Computers in Education Journal*, Vol. 3, No. 4, Oct-Dec 2012, pp. 26-35. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

J. T. Hagen and B. E. Mullins, "TCP Veto: A Novel Network Attack and its Application to SCADA Protocols," *2013 IEEE PES Conference on Innovative Smart Grid Technologies*, Washington DC, Feb 2013, pp. 1-6. [CCR]

B. W. Ramsey, M. A. Temple, and B. E. Mullins, "PHY Foundation for Multi-Factor ZigBee Node Authentication," *2012 IEEE Global Communications Conference (GLOBECOM 12)*, Anaheim CA, Dec 2012, pp. 813-818. [CCR]

B. W. Ramsey, B. E. Mullins, and Edward D. White, "Improved Tools for Indoor Zigbee Warwalking," *7th International Workshop on Practical Issues in Building Sensor Network Applications 2012* (SenseApp 2012), Clearwater FL, Oct 2012, pp. 925-928. [CCR]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AFIT Liaison to NSA's Information Assurance Scholarship Program (IASP).

Designed and implemented the ACE Hackfest Capture the Flag exercise – 2.5 day exercise.

Member: AFIT/EN Awards Committee, Selection Committee for the 2013 IEEE Eta Kappa Nu C. Holmes MacDonald Outstanding Teaching Award, Technical Program Committee for the 9th *International Conference on Cyber Warfare and Security (ICWS 2014)*, Technical Program Committee for the 8th

International Conference on Information Warfare and Security (ICIW 2013), Advisory Board for the Global Information Assurance Certification for the SANS Institute, Advisory Board for the Department of Electrical Engineering and Computer Science, University of Evansville.

Chairman: AFIT/ENG Awards and Honors Committee, AFIT/ENG Computer Networks Sequence.

Reviewer, 11th European Conference on Information Warfare and Security (ECIW 2012).

Liaison, AFIT/EN Professional Engineering.

PACHTER, MEIR,

Professor, Department of Electrical and Computer Engineering, AFIT Appointment Date: 1993 (AFIT/ENG); BS, Israel Institute of Technology, 1967; MS, Israel Institute of Technology, 1969; PhD, Israel Institute of Technology, 1975. Dr. Pachter's fields of expertise include automatic control of aircraft and missiles, adaptive control and system identification, inertial and GPS navigation, autonomous control/neural networks/fuzzy logic control, nonlinear control, and applied mathematics. Dr. Pachter has published papers in these areas and in differential games, robotics, and the theory of computational geometry. Dr. Pachter is interested in the application of mathematics to the solution of engineering and scientific problems. His current areas of interest include military operations optimization, cooperative control, estimation and optimization, statistical signal processing, adaptive optics, inertial navigation, and GPS navigation. For his work on adaptive and reconfigurable flight control, he received the AF Air Vehicle's Directorate Foulouis award for 1994, together with Phil Chandler and Mark Mears. Tel. 937-255-3636 x7247 (DSN 785-3636 x4593), email: Meir.Pachter@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Autonomous Control and Navigation." Sponsor: AFRL/RW. Funding: \$45,000. [ANT]

"Decision Support Techniques." Sponsor: AFRL/RV. Funding: \$10,000. [ANT]

"Games, Information and Deception Exploitation for Adversarial Network Systems." Sponsor: AFOSR. Funding: \$37,720. [ANT]

REFEREED JOURNAL PUBLICATIONS

M. Park, K. Krishnamoorthy, M. Pachter, S. Dharba and P. Chandler: "State Partitioning Based Linear Program for Stochastic Dynamic Programs – An Invariance Property," *Operations Research Letters*, Vol. 40, No. 6, Nov 2012, pp. 487-491. [ANT]

K. J. Ross, K. M. Hopkinson and M. Pachter: "Using a Distributed Agent – Based Communication – Enabled Special Protection System to Enhance Smart Grid Security," *IEEE Trans. On Smart Grid*, Vol. 4, No. 2, Jun 2013, pp.1216-1224. [ANT]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

K. Kalayanam, M. Pachter and P. Chandler: "A Lower Bounding Linear Programming Approach to the Perimeter Patrol Stochastic Control Problem," *AIAA Infotech Aerospace 2012*, 2012, Garden Grove, CA, AIAA Paper 2012- 2454. [ANT]

M. Pachter and A. Relyea: "A Covariance Analysis of Vision – Aided Inertial Navigation – 3D Free Fall Case," *I. Y. Bar-Itzhack Memorial Symposium on Estimation, Navigation and Spacecraft Control*, Haifa, Israel, Oct 14-17, 2012, pp. 568 - 587. [ANT]

K. Kalayanam, S. Dharba, M. Pachter and P. Chandler: "Sub-Optimal Stationary Policies for a Class of Stochastic Optimization Problems Arising in Robotic Surveillance Applications," *ASME 5th Annual*

Systems and Control Conference/DSCC/MOVIC 2012, Oct. 17 – 19, 2012, Ft. Lauderdale, FL, Paper No. 8610. Semi-Plenary Presentation. [ANT]

K. Kalayanam, S. Dharba, M. Pachter and P. Chandler: ``UAV Search & Capture of a Moving Ground Target Under Delayed Information,” 51th IEEE Conference on Decision and Control, Dec 10 – 13, Maui, Hawaii, pp. 3092-3097. [ANT]

M. Pachter, T. Welker, R. Huffman: ``Covariance Analysis of a Gyro-Free INS,” 53rd Israel Annual Conference on Aerospace Sciences, Mar 6-7, 2013, Tel Aviv, Israel. [ANT]

T. Welker, R. Huffman, M. Pachter: ``Modeling Earth’s Gravitational Gradients for GPS – Free Navigation,” Paper MoC01.4, American Control Conference, Jun 16-19, 2013, Washington, DC. [ANT]

K. Kalayanam, S. Dharba, P. Khargonekar, D. Casbeer, P. Chandler and M. Pachter: ``Optimal Minimax Pursuit-Evasion on a Manhattan Grid,” Paper TuB 11.6, American Control Conference, Jun 16-19, 2013, Washington, DC. [ANT]

BOOKS AND CHAPTERS IN BOOKS

M. Pachter and K. Pham ``Information Patterns in Discrete-Time Linear-Quadratic Dynamic Games,” in Sensors: Theory, Algorithms and Applications, V. Boginski, C. Commander, P. M. Pardalos and Y. Ye, Eds., pp. 83-115, Springer, 2012. [ANT]

M. Pachter and K. Pham: ``The Role of Information in Nonzero-Sum Differential Games,” in Dynamics of Information Systems: Mathematical Foundations , A. Sorokin, R. Murphey, M. Thai and P. M. Pardalos, Eds., pp. 281-303, Springer 2012. [ANT]

K. Pham and M. Pachter: ``Information Considerations in Muti-Person Cooperative Control/Decision Problems Information Sets, Sufficient Information Flows and Risk Averse Decision Rules for Performance Robustness,” in Dynamics of Information Systems: Mathematical Foundations , A. Sorokin, R. Murphey, M. Thai and P. M. Pardalos, Eds., pp. 297-318, Springer 2012. [ANT]

K. Pham and M. Pachter: ``Modeling Interactions in Complex Systems – Self Coordination, Game Theoretic Design Protocols and Performance Reliability Aided Decision Making,” in Dynamics of Information Systems: Mathematical Foundations, A. Sorokin, R. Murphey, M. Thai and P. M. Pardalos, Eds., pp. 319-361, Springer 2012. [ANT]

K. Krishnamoorthy, M. Pachter, S. Dharba and P. Chandler: ``Approximate Dynamic Programming Applied to UAV Perimeter Patrol,” Recent Advances in Research on UAVs, Lecture notes in Control and Information Sciences Vol. 444, pp. 119-146, Springer Verlag, Berlin, 2013, F. Fahroo, L. Y. Wang and G. Yin, Eds. [ANT]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Associate Editor of the Journal of Optimization Theory and Applications (JOTA).

Member of the following professional societies: IEEE, AIAA and ION.

Member of the IEEE committee “Engineers at Risk.”

Reviewer: IEEE Trans. on Automatic Control, IEEE Trans. on Aerospace and Electronic Systems, AIAA J. of Guidance, Control and Dynamics, International Journal of Control.

PETERSON, GILBERT L.,

Associate Professor of Computer Science, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2002 (AFIT/ENG); BS Architecture University of Texas at Arlington, 1995; MS,

Computer Science, University of Texas at Arlington, 1998; PhD, University of Texas at Arlington, 2001. His research interests include uncertainty in artificial intelligence, robotics, machine learning, and digital forensics. Tel. 937-255-6565 x4281 (DSN 785-6565 x4281), email: Gilbert.Peterson@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Maximization of Observability in Navigation for Autonomous Robotic Control (MONARC).” Sponsor: AFRL/RV. Funding: \$75,000 – Peterson 80%, Raquet 20%. [ANT]

REFEREED JOURNAL PUBLICATIONS

Karrels, D.R., Peterson, G.L., and Mullins, B.E., “Large-scale Cooperative Task Distribution on Peer-to-Peer Networks,” *Web Intelligence and Agent Systems*, Vol. 11, No. 1, 2013, pp. 67-79. [CCR]

Bryant, A., Mills, R., Grimaila, M., and Peterson, G., “Top-level Goals in Reverse Engineering Executable Software,” *Journal of Information Warfare*, Vol. 12, No. 1, 2013, pp. 32-43. [CCR]

Grimaila, M.R., Myers, J., Mills, R.F., and Peterson, G.L., “Design and Analysis of a Dynamically Configured Log-based Distributed Security Event Detection Methodology,” *The Journal of Defense Modeling and Simulation: Applications, Methodology, Technology*, Vol. 9, No. 2, 2012, pp 219-241. DOI: 10.1177/1548512911399303. [CCR]

Compton, M.D., Hopkinson, K.M., Peterson, G.L., and Moore, J.T., “Using Modeling and Simulation to Examine the Benefits of a Network Tasking Order,” *Journal of Defense Modeling and Simulation*, Vol. 9, No. 3, 2012, pp. 205-217. DOI: 10.1177/1548512910371702.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Noel, G., and Peterson, G.L., “Context-Driven Image Annotation Using ImageNet,” *The 26th International FLAIRS Conference*, 2013, pp. 462-467.

Bryant, A.R., Mills, R.F., Grimaila, M.R., and Peterson, G.L., “Top-Level Goals in Reverse Engineering Executable Software,” *8th International Conference on Information Warfare and Security ICIW-2013*, 2013, pp. 16-23. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS ON ABSTRACT REVIEW

Eng, K.G., Peterson, G.L., Kresge, J.T., and Campbell, J.L., “Intelligent Behavioral Action Aiding for Improved Image Navigation,” *Proceedings of the 25th International Technical Interchange Meeting*, San Diego, CA, pp. 771-779. [ANT]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Vice-Chair, International Federation for Information Processing, Working Group 11.9 – Digital Forensics.

Co-Chair, Ninth Annual IFIP WG 11.9 International Conference on Digital Forensics.

Committee Member, (ISC)² Cyber Forensic Professional Credential (CFPC) Exam Development Committee.

Board Member of the Department of Defense Cyber Crime Center (DC3) Academic Cyber Curriculum Alliance (DACCA) for the development of the National Centers of Digital Forensics Academic Excellence Program and accreditation process.

Program Committee Member: 12th Annual Digital Forensics Research Workshop, IEEE Systematic Approaches to Digital Forensics Engineering (SADFE-2012), 8th International Conference on Information Warfare and Security (ICIW), Journal Reviewing for 4 journals.

ENG, GCE Program Chair, Sequence Chair, Artificial Intelligence Sequence.

POCHET, MICHAEL C., Maj,

Division Chief and Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2010 (AFIT/ENG); BS, Electrical Engineering, Virginia Tech, 2001; MS Electrical Engineering, Air Force Institute of Technology, 2006; PhD, Electrical Engineering, University of New Mexico, 2010. His research interests include techniques for high-speed direct modulation of novel semiconductor laser structures and development of cathode materials for high power microwave sources. Tel. 937-255-3636 x4393 (DSN 785-3636 x4396), email: Michael.Pochet@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Optically Injected Semiconductor Lasers for Microwave Generation.” Sponsor: AFOSR. Funding: \$13,888.

REFEREED JOURNAL PUBLICATIONS

Pochet, M., Locke, T., and Usechak, N. G., “Generation and Modulation of a Millimeter-Wave Subcarrier on an Optical Frequency Generated via Optical Injection,” *IEEE Photonics Journal*, 4(5), 1881-1891 (Oct 2012).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Harvey, E., Pochet, M., Schmidt, J., Locke, T., Naderi, N., and Usechak, N. G., "All-optical logic gates and wavelength conversion via the injection-locking of a Fabry-Perot semiconductor laser," *Proc of SPIE* 8628-14, 8628-14(1-11) (Feb 2013).

Pochet, M., Campbell, J., Coutu, R., Fairchild, S., Boeckl, J., “Fabrication of Patterned Carbon Nanotube Field Emission Surfaces on SiC Substrates,” *Materials Research Society Fall Proceedings* W3.42 (6 pages) (Nov 2012).

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Electrical Engineering Division Chief within the Department of Electrical and Computer Engineering.

AFOSR proposal reviewer for Heng Song (AFOSR/AOARD).

Peer reviewer: IEEE Photonics Journal, IEEE Journal of Selected Topics in Quantum Electronics, Journal of Applied Physics, Optical Society of America Optics Letters.

Session Judge at 51st National Junior Science & Humanities Symposium (JSHS).

RAQUET, JOHN F.,

Director, Advanced Navigation Technology (ANT) Center; Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT Appointment Date: 1998 (AFIT/ENG); BS, US Air Force Academy, 1989; MS, Massachusetts Institute of Technology, 1991; PhD, University of Calgary, Canada, 1998. Dr. Raquet's areas of interest include Global Positioning System (GPS) precise positioning, non-GPS precision navigation, optically-aided navigation, navigation using signals of opportunity, integration of MEMS-based inertial measurement units with other sensors, autonomous vehicle navigation and control, and electromagnetic interference and mitigation techniques affecting GPS performance. Tel. 937-255-3636 x4580 (DSN 785-3636 x4580), email: John.Raquet@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“ANT Center and Laboratory Support per Attachment 6 of the MOA between AFIT and AFRL.” Sponsor: AFRL/RV. Funding: \$200,000 – Raquet 50%, Haker 50%. [ANT]

“ANT Center and Laboratory Support per Attachment 6 of the MOA between AFIT and AFRL.” Sponsor: AFRL/RW. Funding: \$100,000 – Raquet 50%, Fisher 50%. [ANT]

“Autonomous System Testbed Development.” Sponsor: AFRL/RW. Funding: \$90,000. [ANT]

“Correlator Beam Forming for GPS Signals.” Sponsor: Locata. Funding: \$70,000 – Raquet 50%, Collins 40%, Haker 10%. [ANT]

“Support for All-Source Positioning and Navigation (ASPN) Program Phase II.” Sponsor: DARPA. Funding: \$103,000 – Raquet 50%, Woolley 20%, Kauffman 30%. [ANT]

“Ultra-High Accuracy Reference System (UHARS) Support.” Sponsor: 746 TS/AFMC. Funding: \$50,000 – Raquet 90%, Fisher 10%. [ANT]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Curro, J., T. Pestak, and J. Raquet, “Boresighting a LiDAR without Accurate Range Measurements for Relative Navigation,” Proceedings of 2013 International Technical Meeting of the ION, San Diego, CA, Jan 2013. [ANT]

Kauffman, K and J. Raquet, “Self-Building World Model for Magnetometer-based Navigation Using a Distributed Sensor Network,” *Proceedings of ION GNSS+-2013*, Nashville, TN, Sep 2013. [ANT]

Kauffman, K., J. Raquet, Y. Morton, and D. Garmatyuk, “Experimental Study of Two-channel UWBOFDM Radar for Indoor Navigation with INS Integration,” *Proceedings of ION GNSS+-2013*, Nashville, TN, Sep 2013. [ANT]

BOOKS AND CHAPTERS IN BOOKS

Garmatyuk, D., K. Kauffman, J. Raquet, Y. Morton, “Multifunctional Software-Defined Radio Sensors for Detection, Imaging, and Navigation,” *Low Power Emerging Wireless Technologies*, ed. R. Mahmoudi and K. Iniewski, CRC Press, pp. 99-115, Feb 2013. [ANT]

PATENTS

Morrison, J., J. Raquet, and M. Veth, “Coded Aperture Aided Navigation and Geolocation System,” Patent No. 8,577,539, Issued 5 Nov 2013. [ANT]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Chairman, Satellite Division of the Institute of Navigation.

Member, Awards Committee, Institute of Navigation.

Raquet, J., “Calculation of GPS PNT Solution,” presented to 50 faculty and students at the Workshop on GNSS Data Application to Low Latitude Ionospheric Research, May 2013. [ANT]

Raquet, J., “Introduction to Kalman Filters,” presented to 50 faculty and students at the Workshop on GNSS Data Application to Low Latitude Ionospheric Research, May 2013. [ANT]

Raquet, J., “Image-Based Navigation,” presented to 45 industrial members, faculty, and students from COUNT consortium, May 2013. [ANT]

Raquet, J., “Alternative Navigation Techniques,” presented to technical staff members at MITRE, Dec 2012. [ANT]

Raquet, J., "Alternative Navigation Techniques," presented to 20 technical staff members at Honeywell, Oct 2012. [ANT]

ROBINSON, DAVID J., Lt Col,

Assistant Professor of Computer Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2010 (AFIT/ENG); BS, Computer Science and Engineering, University of Connecticut, 1996; MSCE, Air Force Institute of Technology, 2000; PhD, Computer Engineering, Dartmouth College, 2010. His research interests include cyber-based behavioral modeling, quantitative analysis of cyber (science of cyber), and pro-active cyber defense. Tel. 937-255-3636 x4598 (DSN 785-3636 x4598), email: David.Robinson@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Collaborating with Air Force and Army Surgeon General's office on cyber-based suicide detection.

Collaborating with Cincinnati Children's Hospital to gain access to largest collection of suicide letters ever collected.

Enlisted the Dean of Psychology at WSU (Dr Larry James) to collaborate on cyber-based suicide detection work.

SILVIUS, MARK D., Maj,

Assistant Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2009 (AFIT/ENG), BS, Cornell University, 1999; MS, Syracuse University, 2003; PhD, Virginia Polytechnic Institute and State University, 2009. His research interests are wireless communications digital design field programmable gate arrays, and cognitive radio.

SPONSOR FUNDED RESEARCH PROJECTS

"Technical Support: Cognitive Communications Research." Sponsor: AFRL/RV. Funding: \$25,000 – Silvius 31%, Hopkinson 30%, McTasney 29%, Mills 10%.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

McLean, R. K., Silvius, M. D., Hopkinson, K. M., "Method for Evaluating k-Means Clustering for Increased Reliability in Cognitive Radio Networks," in *IEEE Software Security and Reliability (SERE)*, Washington, DC, Jun 18-23, 2013, pp. 99-108.

McLean, R. K., Flatley, B. N., Silvius, M.D., Hopkinson, K. M., "FPGA-Based RF Spectrum Merging and Adaptive Hopset Selection," in *IEEE Aerospace Conference*, Big Sky, MT, Mar 2-9, 2013, pp. 1-8.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewer: 3rd International Conference on Information and Communication Technology (ICT) Convergence (ICTC 2012), IEEE Military Communications Conference (MILCOM 2013).

TEMPLE, MICHAEL A.,

Professor of Electrical Engineering, Department of Electrical and Computer Engineering at the USAF Institute of Technology (AFIT). AFIT Appointment Date: 1996 (AFIT/ENG). BSE (1985) and MSE (1986), Southern Illinois University, Edwardsville IL. PhD, AFIT, 1993. Research interests include passive emitter identification, tracking and location using RF Distinct Native Attribute (RF-DNA) fingerprinting and complex waveform generation via Spectrally Modulated, Spectrally Encoded (SMSE) processing. Sponsored research efforts in Command, Control, Communications and Intelligence (C3I) and Electronic Warfare (EW), as adopted by and/or transitioned to agencies within the US Department of Defense, has provided over \$2M in R&D Technology benefit. Senior member of IEEE (Jan 2002). Tel. 937-255-3636 x4279 (DSN 785-3636 x4279), email: Michael.Temple@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“RFINT Algorithm Development.” Sponsor: ORNL. Funding: \$45,000. [CCR]

“RFINT for Commercial Communications.” Sponsor: AS&T. Funding: \$90,032. [CCR]

REFEREED JOURNAL PUBLICATIONS

Montminy, Baldwin, Temple, and Laspe, “Improving Cross-Device Attacks Using Zero-Mean Unit-Variance Normalization,” *Jour of Cryptologic Engineering*, Springer, Vol. 3, No. 2, pp. 99-110, Jun 2013. [CCR]

Li, Hong, Chakravarthy, Temple, and Wu, “Intercarrier Interference Immune SC-OFDM via Magnitude-Keyed Modulation for High Speed Aerial Vehicle Communication,” *IEEE Trans on Communications*, Vol. 61, No. 2, pp. 658-668, Dec 2012.

Stone, Temple, “RF-Based Anomaly Detection for PLCs in Critical Infrastructure Apps,” *Int’l Jour on Critical Infrastructure Protection*, Vol. 5, No. 2, pp. 66-73, 2012. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kuciapinski, Temple, Werling, McGuire, “(U) RFINT for Satellite Communications,” *2013 Nat’l SIGINT Development Conf*, Baltimore MD, Classified Proceedings, Jun 2013. [CCR]

Harmer, Reising, Temple, Lopez, “Classifier Selection for Physical Layer Security Augmentation in Cognitive Radio Networks,” *2013 IEEE Int’l Conf on Communications (ICC13)*, Jun 2013, Budapest, Hungary. [CCR]

Gutierrez, Jackson, Temple, “Receive Signal Processing for OFDM-Based Radar Imaging,” *38th Int’l Conf on Acoustics, Speech, and Signal Processing (ICASSP13)*, May 2013, Vancouver Canada.

Harmer, Temple, “An Improved LFS Engine for Physical Layer Security Augmentation in Cognitive Networks,” *Int’l Conf on Computing, Networking and Communications (ICNC13)*, San Diego, CA, Jan 2013, pp. 719-723. [CCR]

Han, Li, Temple, and Wu+, “Intercarrier Interference Cancellation for Wideband OFDM in High Speed Aerial Vehicle Comm,” *Int’l Conf on Computing, Networking and Communications (ICNC13)*, San Diego, CA, Jan 2013 pp. 23-27.

Ramsey, Temple, Mullins, “PHY Foundation for Multi-Factor ZigBee Node Authentication,” *2012 IEEE Global Communications Conf (GLOBECOM12)*, Anaheim, CA, Dec 2012, pp. 795-801. [CCR]

Booth, Killpack, Kuciapinski, Temple, “(U) RF-DNA Applied to Commercial SatCom,” *2012 Military Communications Conf (MILCOM12)*, Classified Proceedings, 978-1-4673-3C/pp. 28-32, Orlando, FL, Oct 2012. [CCR]

Dubendorfer, Ramsey, Temple, “An RF-DNA Verification Process For ZigBee Networks,” *2012 Military Communications Conf (MILCOM12)*, Unclassified Proceedings, 978-1-4673-3/pp. 12-16, Orlando, FL, Oct 2012. [CCR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Armijos, Lanzerotti, Silvius, Temple, Martin, Cerny, Ovenshire, Fisher, “High-Speed Tunable Filters for Agile RF Receivers,” *2013 Government Microcircuit Apps & Critical Tech Conference (GOMAC13)*, Las Vegas, NV, 11-15, Mar 2013. [CCR]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Manager, RF Signal Exploitation Lab (RFSEL).

Chairman: ENG Promotion & Tenure Committee, Communications Curricula.

Member, Multi-Agency SME Tech Panel: Nat'l Nuclear Security Administration, Office of Nonproliferation Research and Engineering (NNSA/NA-22), Oak Ridge Nat'l Lab, Oakridge, TN.

Technical Reviewer: Various IEE and IEEE journals, transactions, conferences.

RFINT Supervisory Control And Data Acquisition (SCADA) Security Briefing, Teresa M. Takai (SES), DOD Chief Information Officer (DOD CIO), 2012.

RFINT Experimental-to-Operational Transition, Technical Director (SES) Briefing, NSA Central Security Service (NSA/CSS), 2012.

RFINT SCADA Security Briefing, Congressman Mike Turner (R-OH-3) and Congresswoman Loretta Sanchez (D-CA-27), Oct 2012.

RFINT SCADA Security Briefing, Mr. Steve Bailey (SES), NSA Senior Executive Academic Liaison, Jan 2013.

Super SCADA/RFINT Security Briefing, Brig Gen William Thorton, AFMC/A3, Feb 2013.

Wireless RFINT Security Application Briefing, Mr. Tom Peters (SES), NSA R&D, Jun 2013.

TERZUOLI, ANDREW J., Jr.,

Associate Professor of Electrical Engineering, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 1982 (AFIT/ENG); BS, Electrical Engineering, Polytechnic Institute of Brooklyn, 1969;
MS, Electrical Engineering, Massachusetts Institute of Technology, 1970; PhD, Electrical Engineering, The Ohio State University, 1982. His research areas have included Antennas and Electromagnetics; Computer Model Based Studies; Application of Parallel Computation, VLSI Technology, and RISC Architecture to Numerical and Transform Methods; Remote Sensing and Communication; Passive RF Sensing; Wave Scattering, Radar Cross Section, and Stealth (LO/CLO) Technology; Machine Vision and Image Processing; Automated Object Recognition. He has published numerous reports and articles in journals and conference proceedings in these and related areas. His research is funded by various agencies including AFRL and NASIC. Prior to joining AFIT in 1982, Dr. Terzuoli was a research associate at the ElectroScience laboratory at the Ohio State University, and was a member of the technical staff at the Bell Telephone Laboratories in New Jersey. He is an active officer of IEEE, and a fellow of the Electromagnetics Academy. Tel. 937-255-3636 x4717 (DSN 785-3636 x4717), email: Andrew.Terzuoli@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Remote Sensing and Communications for Advanced Technical Exploitation.” Sponsor: NASIC. Funding: \$240,000.

REFEREED CONFERENCE PAPERS ON THE BASIS OF ABSTRACT REVIEW

J. M. Wilson, S. D. Hartzell, T. M. Tran, J. T. Black, R. J. Marhefka, A. J. Terzuoli, Jr., “Analysis and Feed Design of a Sparse Aperture Parabolic Reflector,” Proceedings of the 2103 IEEE International Symposium on Antennas and Propagation and USNC/URSI National Radio Science Meeting, Orlando, FL, 7-13 Jul 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Member: IEEE, Association of Old Crows (AOC).

Local Chapter Chair for Joint IEEE Societies APS, MTT, GRS.

Paper reviewer for IEEE.

Member: AFIT-AFRL-NASIC passive radar working group (PCR WG), DOD Over the Horizon Radar working group (OTHR WG), WPAFB Reconnaissance Steering Group (RSG), Joint AFIT-AFRL-NASIC Wright Patt MASINT Development Consortium (WPMDC), NIC/MDA Air and Missile Defense Advisory Panel, Passive OTH Radar Advisory Boards.

Reviewer for AFRL/AFOSR/EOARD project progress for RF & EM sensing.

Serves as Senior Research Associate for AFRL & NASIC.

WOOLLEY, BRIAN G., Capt,

Assistant Professor of Computer Science, Department of Electrical and Computer Engineering, AFIT
Appointment Date: 2012 (AFIT/ENG); BS, Computer Engineering, California State University, Sacramento, 2002; MS Computer Engineering, Air Force Institute of Technology, 2007; PhD, Computer Engineering, University of Central Florida, 2012. His research interests include artificial intelligence for autonomous vehicles, evolutionary computation of control behaviors, and sensor fusion via computer vision techniques for world modeling. Tel. 937-255-3636 x4618 (DSN 785-3636 x618), email: Brian.Woolley@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Increased Understanding of Vision-Aided Navigation Uncertainty Estimates.” Sponsor: AFRL/RV. Funding: \$25,000. [ANT]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Program Chair of the Artificial Life / Evolutionary Robotics track at GECCO 2013. [ANT]

Served as judge for the 51st National Junior Science & Humanities Symposium (JSHS). [ANT]

Graduated the Cyberspace 300 professional development course. [ANT]

5.3. DEPARTMENT OF ENGINEERING PHYSICS

Access Phone 937-255-2012, DSN 785-2012

Fax: 937-656-6000, DSN 786-6000

Homepage: <http://www.afil.edu/en/enp/>

5.3.1	<u>DOCTORAL DISSERTATIONS</u>	105
5.3.2	<u>MASTER'S THESES</u>	105
5.3.3	<u>FACULTY BIOGRAPHIES & RESEARCH OUTPUT</u>	108

5.3.1. DOCTORAL DISSERTATIONS

BOSTICK, RANDALL L., *Development and Characterization of a Chromotomosynthetic Hyperspectral Imaging System*. AFIT/ENP/DS/13M-02. Faculty Advisor: Dr. Glen P. Perram. Sponsor: NASIC. [CTISR]

BUCHANAN, DOUGLAS A., *EPR and ENDOR Studies of Point Defects in Lithium Tetraborate Crystals*. AFIT/ENP/DS/12D-01. Faculty Advisor: Dr. John W. McClory. Sponsor: USAFA.

GALLAGHER, JEFFREY E., *Optically Pumped Atomic Rubidium Lasers: Two-Photon and Exciplex Excitation Mechanisms*. AFIT/ENP/DS/13J-01. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

LOPER, ROBERT D., *Collisional Broadening and Shift of D1 and D2 Spectral Lines in Atomic Alkali Vapor - Noble Gas Systems*. AFIT/ENP/DS/13M-03. Faculty Advisor: Dr. David E. Weeks. Sponsor: HELJTO. [CDE]

MCNABB, SUZANNA J., *An Exponential Moment Method for Modeling Transient Behavior in Multicomponent Isotope Enrichment Cascades*. AFIT/ENP/DS/13J-02. Faculty Advisor: Dr. Kirk A. Mathews. Sponsor: AFTAC.

RICE, CHRISTOPHER A., *Investigation of Diode Pumped Alkali Laser Atmospheric Transmission Using Tunable Diode Laser Absorption Spectroscopy*. AFIT/ENP/DS/12D-07. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

SEAL, MICHAEL D., *Directional Thermal Emission and Absorption from Surface Microstructures in Metalized Plastics*. AFIT/ENP/DS/13S-03. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: N/A. [CDE]

VAP, JASON C., *Design and Characterization of Optical Metamaterials Using Tunable Polarimetric Scatterometry*. AFIT/ENP/DS/12-03. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: N/A. [CDE]

5.3.2. MASTER'S THESES

ADOMANIS, BRYAN M., *A Characterization Study of Highly-Tailorable 3-D Metamaterials in the Thermal Infrared for Spectral and Directive Emission Behaviors*. AFIT/ENP/13M-01. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: AFRL/RX. [CDE]

BARKI, ANUM, *An Inverse Kinematic Approach Using Groebner Basis Theory Applied to Gait Cycle Analysis*. AFIT/ENP/13M-02. Faculty Advisor: Dr. Ronald F. Tuttle. Sponsor: NRL. [CTISR]

BEST, JEREMY S., *Electron Damage Effects on Carbon Nanotube Thin Films*. AFIT/ENP/13M-37. Faculty Advisor: Dr. John W. McClory. Sponsor: NRL.

BLANNING, AARON B., *Electronic Characteristics of Rare Earth Doped GaN Schottky Diodes*. AFIT/ENP/13M-03. Faculty Advisor: LTC Stephen R. McHale. Sponsor: DTRA.

BROADWATER, DAVID J., *A Comparison of Ionospheric Model Performance for International Space Station Orbits*. AFIT/ENP/13M-04. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: AFWA, USU/CASS & NASA.

CARLSON, EVAN J., *Development of a Spectropolarimetric Capability*. AFIT/ENP/13M-05. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: DTRA. [CTISR]

CASTILOW, JACOB G., *Crystal Growth and Characterization of ThO_2 and $\text{U}_x\text{Th}_{1-x}\text{O}_2$* . AFIT/ENP/13M-06. Faculty Advisor: Capt Timothy W. Zens. Sponsor: DHS.

ESHEL, BEN, *Spectral Analysis and Metastable Absorption Measurements of High Pressure Capacitively and Inductively Coupled Radio-Frequency Argon Helium Discharges*. AFIT/ENP/13J-02. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

FAGAN-KELLY, STEEFAN B., *Three Dimensional Positron Annihilation Momentum Spectroscopy of Lithium Tetraborate Crystals*. AFIT/ENP/13M-09. Faculty Advisor: Dr. Larry W. Burggraf. Sponsor: AFOSR.

FORD, MICHAEL, *Neutron Spectroscopy Using LiF Thin-Film Detectors*. AFIT/ENP/13M-10. Faculty Advisor: LTC Stephen R. McHale. Sponsor: AFOSR.

FREY, WILLIAM R., *Modeling the Thermosphere as a Driven-Dissipative Thermodynamic System*. AFIT/ENP/13M-11. Faculty Advisor: Capt Matthew B. Garvin. Sponsor: AFWA & AFRL/RV.

GUY, MATTHEW R., *Investigation of the Atmospheric Propagation of Alkali Lasers in a Maritime Environment Using Tunable Diode Laser Atmospheric Spectroscopy*. AFIT/ENP/13M-12. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

HADFIELD, ZACHARY L., *Cathodoluminescence and Thermoluminescence of Undoped LTB and LTB:A (A = Cu, Ag, Mn)*. AFIT/ENP/13M-13. Faculty Advisor: Dr. Robert L. Hengehold. Sponsor: DHS.

HIGLEY, TIMOTHY M., *Modeling Radioactive Decay Chains with Branching Fraction Uncertainties*. AFIT/ENP/13M-14. Faculty Advisor: Dr. Kirk A. Mathews. Sponsor: AFTAC.

HOFFMANN, LUCAS J., *Thermogravimetric Analysis of Bacillus Anthracis Spores and DNA by Spectroscopy and Chromatography of Pyrolysis Products*. AFIT/ENP/13M-15. Faculty Advisor: Dr. Larry W. Burggraf. Sponsor: DTRA.

IMHOF, ERIC A., *Chip-Scale Magnetic Source of Cold Atoms*. AFIT/ENP/13J-03. Faculty Advisor: Dr. Glen P. Perram. Sponsor: AFRL/RV.

JACOB, MARTIN A., *Passive Ranging Using a Dispersive Spectrometer and Optical Filters*. AFIT/ENP/12D-02. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: NASIC. [CTISR]

KEITH, ALANNA, *Discrimination of Neutral Postures in Computer Based Work*. AFIT/ENP/13M-19. Faculty Advisor: Dr. Amy L. Magnus. Sponsor: AFOSR. [CTISR]

KEITH, STEPHANIE R., *Discrimination between Child and Adult Forms Using Radar Frequency Signature Analysis*. AFIT/ENP/13M-20. Faculty Advisor: Dr. Amy L. Magnus. Sponsor: AFRL/RV. [CTISR]

KRESS, ROBERT J., *Analysis of a Van De Graaff Generator for EMP Direct Current Survivability Testing*. AFIT/ENP/13M-39. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFRL/RX.

LEE, MICHAEL G., *Depth-Resolved Cathodoluminescence of Thorium Dioxide*. AFIT/ENP/13M-21. Faculty Advisor: Dr. Robert L. Hengehold. Sponsor: DHS.

LLOYD, ROBERT L., *Multipactor Discharge in High Power Microwave Systems: Analyzing Effects and Mitigation through Simulation in ICEPIC*. AFIT/ENP/13M-22. Faculty Advisor: Dr. William F. Bailey. Sponsor: AFRL/RD. [CDE]

LOYD, NATHANIEL C., *Passive, Low Cost Neutron Detectors for Neutron Diagnostics at the National Ignition Facility*. AFIT/ENP/13M-23. Faculty Advisor: Dr. John W. McClory. Sponsor: AFNWC.

LYNES, DAVID D., *An Analysis of Methods to Determine Nuclear Weapon Yield Using Digital Fireball Films*. AFIT/ENP/13M-24. Faculty Advisor: Maj Benjamin R. Kowash. Sponsor: AFNWC.

MARCHAND, ANTHONY D., *Neutron Shielding Effectiveness of Multifunctional Composite Materials*. AFIT/ENP/13M-25. Faculty Advisor: Dr. John W. McClory. Sponsor: AFRL/RX.

MCMAHON, ROBERT E.T., II, *Neutron Displacement Damage Effects in InGaP/GaAs HBTs*. AFIT/ENP/12D-03. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.

MONROE, MISCHA L., *Element Identification for Forensics Analysis of Nuclear Fallout Debris Samples Utilizing Mico-XRF, SEM, and Autoradiography Mapping*. AFIT/ENP/13M-26. Faculty Advisor: Dr. John W. McClory. Sponsor: AFNWC.

PACLEB, CURTIS W., *Analysis of the Nuclear Thermal Pulse Using Digitized Scientific Test Films*. AFIT/ENP/13M-27. Faculty Advisor: LTC Stephen R. McHale. Sponsor: AFNWC.

RICHARDS, RYAN M., *Mirrorless Lasing in Optically Pumped Rubidium Vapor*. AFIT/ENP/13M-41. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

ROWLAND, JON D., *Thermal Effects Analysis on F-16 Paint*. AFIT/ENP/13M-28. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.

SCHERRER, ELIZABETH M., *Damage Equivalency Study of Ions and Neutrons in Silicon Bipolar Junction Transistors*. AFIT/ENP/13M-29. Faculty Advisor: Dr. James C. Petrosky. Sponsor: AFNWC.

SETHI, NEERAJ, *Modeling Sodium Iodide Detector Response Using a Parametric Equations*. AFIT/ENP/13M-30. Faculty Advisor: Maj Benjamin R. Kowash. Sponsor: DTRA.

SHEPHERD, JACK A., III, *Optimization of Coronal Mass Ejection Ensemble Forecasting Using WSA-ENLIL with Coned Model*. AFIT/ENP/13M-31. Faculty Advisor: Dr. Ariel O. Acebal. Sponsor: NASA & AFWA.

SHINN, JAMES F., *Changes to Tensile Strength and Electromagnetic Shielding Effectiveness in Neutron Irradiated Carbon Nanocomposites*. AFIT/ENP/13M-32. Faculty Advisor: Dr. John W. McClory. Sponsor: AFRL/RX.

TAGUBA, CHAD T., *Pump Diode Characterization for an Unstable Diode-Pumped Alkali Laser Resonator*. AFIT/ENP/13M-33. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO. [CDE]

THELEN, PAUL, *Solving Point-Reactor Kinetics Equations Using Exponential Moment Methods*. AFIT/ENP/13M-34. Faculty Advisor: Dr. Kirk A. Mathews. Sponsor: N/A.

WESTMAN, ANDREW J., *Study of Laminar Flame 2-D Scalar Values at Various Fuel to Air Ratios Using an Imaging Fourier-Transform Spectrometer and 2-D CFD Analysis*. AFIT/ENP/13M-36. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: AFRL/RQ.

5.3.3. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

ACEBAL, ARIEL O.,

Assistant Professor of Atmospheric Physics, Department of Engineering Physics, AFIT Appointment Date: 2008 (AFIT/ENP); BS, Florida State University, 1993; MS, Air Force Institute of Technology, 2000; PhD, Utah State University, 2008. Dr. Acebal's research interests cover a range of topics under the broad umbrella of space-physics. Recent work has focused primarily on solar radio emissions with an emphasis on correlations with solar EUV emissions and ionospheric models. He is also interested in the transition of cutting-edge research to operational forecast products. Previously, he worked as the commander of the Palehua Solar Observatory and the branch chief for the Space Weather Branch at the Air Force Weather Agency. He is a member of the American Geophysical Union and is a retired Lt Col from the USAF. Tel. 937-255-3636 x4518 (DSN 785-3636 x4518), email: Ariel.Acebal@afit.edu

REFEREED JOURNAL PUBLICATIONS

Emmons, D., A. Acebal, A. Pulkkinen, A. Taktakishvili, P. MacNeice and D. Odstrcil, "Ensemble forecasting of coronal mass ejections using the WSA-ENLIL with CONED Model," *Space Weather*, Vol. 11, pp. 95–106 (2013).

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Member, DOD Space Weather Requirements Working Group.

Invited as Subject Matter Expert to the Air Force Weather Space Weather Summit.

Reviewed Air Force Space Weather Implementation Plan.

BARTLETT, KEVIN S., Maj,

Assistant Professor of Atmospheric Science, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, University of California, Los Angeles, 1997; MS, Air Force Institute of Technology, 2004; PhD, SUNY-Albany, 2013. Major Bartlett's research covers a wide range of topics in the atmospheric sciences. His recent work has focused on modeling mineral dust emissions and transport in the Middle East as well as aviation weather. Before joining AFIT, previously, he was Detachment Commander of Det 1, 18th Weather Squadron, and Staff Weather Officer to the 3rd Infantry and 10th Mountain Divisions in Iraq and NY. He is a member of the American Meteorological Society, the Air Weather Association and the American Geophysical Union. Tel. 937-255-3636 x4520 (DSN 785-3636 x4520), email: Kevin.Bartlett@afit.edu

REFEREED JOURNAL PUBLICATIONS

Ma, X., K. Bartlett, K. Harmon, and F. Yu: "Comparison of AOD between CALIPSO and MODIS: significant differences over major dust and biomass burning regions," *Atmospheric Measuring Techniques*, Vol. 6, pp. 2391-2401 (2013).

BAILEY, WILLIAM F.,

Associate Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1978 (AFIT/ENP); BS, United States Military Academy, 1964; MS, The Ohio State University, 1966; PhD, Air Force Institute of Technology, 1978. Dr. Bailey's research interests center on weakly ionized gases and reactive kinetics with special applications to semiconductor processing in gas discharges, shock characterization in ionized flows, and solutions of the inhomogeneous electron kinetic equation. Dr. Bailey has published over 20 papers in refereed conference proceedings and international journals and chaired over 25 theses and dissertations. He is a member of Tau Beta Pi, Sigma Pi Sigma, and Sigma Xi. Tel. 937-255-3636 x4501 (DSN 785-3636 x4501), email: William.Bailey@afit.edu

REFEREED JOURNAL PUBLICATIONS

William J. Palm, Michael A. Marciniak, Glen P. Perram, Kevin C. Gross, and William F. Bailey,
“Wavelength- and temperature-dependence of CW laser absorptance in Kapton® thin films,” *Optical Engineering*, Vol. 51, Article No. 121802, Dec 2012. [CDE]

BOREL-DONOHUE, CHRISTOPH C.,

Research Associate Professor, Department of Engineering Physics, AFIT Appointment Date: 2010 (AFIT/ENP); Dipl. El. Eng ETH, Swiss Federal Institute of Technology, Zurich, Switzerland, 1981; PhD, University of Massachusetts, 1988. Professor Borel’s research focuses on visible through thermal hyperspectral data analysis; atmospheric correction; temperature-emissivity separation; Bidirectional Reflectance Distribution Function (BRDF) modeling; adjoint radiosity methods to retrieve reflectance in complex environments; spatial/spectral sharpening and data fusion; Fourier transform spectrometer imaging; atmospheric correction of satellite imagery; scene simulation in the visible and infrared using computer graphics; end-to-end modeling of hyperspectral sensors; and top of atmosphere albedo of the earth. At AFIT, he continues work in the hyperspectral thermal area but is also involved in analyzing video to extract gait information and tracking moving vehicles in persistent surveillance data. For DTRA, he currently works on methods to speed up the prediction of radiation background using remote sensing data. Before joining AFIT, he was a technical staff member at the Los Alamos National Laboratory for 17 years and worked at Ball Aerospace for 5 years. He is a senior member of IEEE and SPIE and the American Geophysical Union. Tel. 937-255-3636 x4957 (DSN 785-3636 x4957), email: Christoph.Borel@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Borel-Donohue, C.C., Bunker, D.J., Tuttle, R.F., Barki, A.N. and Gilbreath, G.C., “Multimodal Gait Signatures and Motion Studies,” 2012 Joint Meeting of the Military Sensing Symposia (MSS) Specialty Group On “Advanced Signatures Technology Symposium (ASTS),” MSS-JOINT-12-041, Paper B104 (Oct, 2012). [CTISR]

Kendricks, K., Barki, A.N., Tuttle, R.F., Bunker, D.J., Borel-Donohue, C.C., “An inverse-kinematic approach using Groebner basis theory applied to gait cycle analysis,” Proceedings of the SPIE Defense, Security and Sensing Symposium,. Vol. 8734, Paper 8734-22 (2013). [CTISR]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Invited seminar, Activity-Based Intelligence End-to-End Testbed for Evaluation of Sensors and Algorithms, National Geospatial-Intelligence Agency, 30 Jul 2013. [CTISR]

BRIDGMAN, CHARLES J.,

Professor Emeritus of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 1960 (AFIT/ENP); BS, United States Naval Academy, 1952; MS, North Carolina State University, 1958; PhD, North Carolina State University, 1963. Dr. Bridgman’s interests center around nuclear weapon effects and military nuclear power applications. He has been associated with nuclear weapon defense since 1952. He was a member of the first military team to be operational on the H-bomb. His current research interest is nuclear weapon fallout modeling. He is the author of a textbook, “Introduction to the Physics of Nuclear Weapons Effects,” and numerous technical articles in a wide variety of journals. In his 38 years on the AFIT faculty, he has chaired over 120 MS theses and PhD dissertations. He has received several awards, including Tau Beta Pi Teacher of the Year and the Gage H. Crocker Outstanding Professor Award. Dr. Bridgman is a Fellow of the American Nuclear Society. Tel. 937-255-3636 x4679 (DSN 785-3636 x4679), email: Charles.Bridgman@afit.edu

BUNKER, DAVID J.,

Director, Center for Technical Intelligence Studies and Research, and Research Assistant Professor of Engineering Physics, Department of Engineering Physics, AFIT Appointment Date: 2010 (AFIT/ENP); BS, Aerospace Engineering, Pennsylvania State University, 1984; MS, Mechanical Engineering, University of Dayton, 1988; PhD, Aerospace Engineering Sciences, University of Colorado, 1994. Dr Bunker’s research

interests include applications of measurement and signature technology, remote sensing, and technical intelligence. Additional interests include high angle of attack and vertical flow structures, unsteady fluid dynamics, experimental wind tunnel testing, and low-speed fluid mechanics. Tel. 937-255-3636 x4547 (DSN 785-3636 x4547), email: David.Bunker@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Overhead Persistent Infra-Red (OPIR) R&D.” Sponsor: NGA. Funding: \$750,000 – Bunker 50%, Borel-Donohue 40%, Tuttle 5%, Walli 5%. [CTISR]

“Rapid Location of Radiation Sources in Complex Environments Using Optical and Radiation Sensors.” Sponsor: DTRA. Funding: \$68,271 – Bunker 25%, Borel-Donohue 50%, Magnus 15%, Tuttle 10%. [CTISR]

“Trajectory Prediction Code Assessment.” Sponsor: NASIC. Funding: \$15,530. [CTISR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Borel-Donohue, C.C., Bunker, D.J., Tuttle, R.F., Barki, A.N. and Gilbreath, G.C., “Multimodal Gait Signatures and Motion Studies,” 2012 Joint Meeting of the Military Sensing Symposia (MSS) Specialty Group On “Advanced Signatures Technology Symposium (ASTS),” MSS-JOINT-12-041, Paper B104 (Oct, 2012). [CTISR]

Kendricks, K., Barki, A.N., Tuttle, R.F., Bunker, D.J., Borel-Donohue, C.C., “An inverse-kinematic approach using Groebner basis theory applied to gait cycle analysis,” Proceedings of the SPIE Defense, Security and Sensing Symposium,. Vol. 8734, Paper 8734-22 (2013). [CTISR]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Committee Member, Military Sensing Symposium BAMS Committee.

Invited seminar, Activity-Based Intelligence End-to-End Testbed for Evaluation of Sensors and Algorithms, National Geospatial-Intelligence Agency, Jul 2013. [CTISR]

BURGGRAF, LARRY W.,

Professor of Engineering Physics and Chemical Physics, Department of Engineering Physics, AFIT
Appointment Date: 1994 (AFIT/ENP); BA, Chemistry, Olivet Nazarene University, 1968; MS, Chemistry, The Ohio State University, 1971; MA, Applied Mathematics, University of West Florida, 1977; PhD, Chemistry, University of Denver, 1981; Postdoctoral Associate, Computational Chemistry, Iowa State University, 1993. Dr. Burggraf conducts experimental and theoretical research in physical chemistry and materials chemistry including radiation biophysics, exotic-atom chemistry, positron spectroscopy, surface and cluster spectroscopy, atomic force microscopy, gamma spectroscopy and radiation imaging to solve DOD, DHS and DOE problems in WMD non-proliferation. Theoretical research to model surfaces, clusters and exotic-atom molecules applies quantum mechanics modeling to interpret experimental results. Dr. Burggraf is author for more than 50 refereed archival publications. Tel. 937-255-3636 x4507 (DSN 785-3636 x4507), email: Larry.Burggraf@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Surface Chemistry of Positrons and Positronium Atoms: Modeling and Spectrometry.” Sponsor: AFOSR. Funding: \$35,909.

REFEREED JOURNAL PUBLICATIONS

Adam C. Stahler, Jennifer L. Monahan, Jessica M. Dagher, Joshua D. Baker, Marjorie M. Markopoulos, Diane B. Iragena, Britney M. NeJame, Robert Slaught, Daniel Felker, Larry W. Burggraf, Leon A.C.

Isaac, David Grossie, Zofia E. Gagnon, Ioana E. Pavel Sizemore, "Evaluating the abnormal ossification in tibiotarsi of developing chick embryos exposed to 1.0 ppm doses of platinum group metals by spectroscopic techniques," *Bone*, Vol. 53, pp. 421–429 (Apr 2013).

Jack G. M. FitzGerald, Larry W. Burggraf, Benjamin R. Kowash, and Ethan L. Hull, "A Modulating Liquid Collimator for Coded Aperture Adaptive Imaging of Gamma-Rays," *IEEE Transactions on Nuclear Science*, Vol. 60, pp. 2300-2307 (Jun 2013).

Alex G. Li, Yun Xing, Larry W. Burggraf, "Thermal Effects on Surface Structures and Properties of Bacillus Anthracis Spores on Nanometer Scales," *Langmuir*, Vol. 29, pp 8343–8354 (Published online: Jun 6, 2013).

Xiaofeng F. Duan, Larry W. Burggraf, and Lingyu Huang, "Searching for Stable SinCn Clusters: Combination of Stochastic Potential Surface Search and Pseudopotential Plane-Wave Car-Parinello Simulated Annealing Simulations" *Molecules*, Vol. 18, pp. 8591-8606 (Published online: 22 Jul 2013).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

G. K. Van Dyk, L. W. Burggraf, and A. A. Bickley, "Focusing Atmospheric Muons through Scattering in Dense Materials," N1-24, *IEEE Nuclear Science Symposium and Medical Imaging Conference Proceedings*, Anaheim, CA (Oct 2012).

S. B. Fagan-Kelly, C. S. Williams, D. A. Buchanan, J. W. McClory, A. M. Bonavita, S. M. Jimenez, and L. W. Burggraf, "Positron Annihilation Momentum Spectroscopy of Nuclear Detection Materials: Coincident Angular Correlation of Annihilation Radiation / Doppler Broadening of Annihilation Radiation (ACAR/DBAR)," N20-8, *IEEE Nuclear Science Symposium and Medical Imaging Conference Proceedings*, Anaheim, CA (Oct 2012).

PATENTS

FitzGerald, Jack G. M., Larry W. Burggraf, and Benjamin Kowash, "Fully Reconfigurable Liquid Collimator for Gamma and X-Ray Radiation Imaging," Provisional Application for Patent (61817567) submitted 30 Apr 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Invited talk, Yun Xing, Alex Li, William Baker, Dan Felker, Larry Burggraf, "Heat Inactivation of Bacillus Anthracis Spores," 2013 CBRN Symposium, WBAFB, OH (3 Apr 2013).

Invited talk, Larry W. Burggraf, Jack FitzGerald, Benjamin Kowash, Justin Clinton "Remote Imaging and Identification of Gamma Radiation Sources: Programmable Coded-Apertures for Gamma Imaging on Mobile Platforms" 2013 CBRN Symposium, WBAFB, OH (3 Apr 2013).

CLINTON, JUSTIN A.,

Visiting Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2013 (AFIT/ENP); BS, Nuclear Engineering, 2004; PhD, Nuclear Engineering, Rensselaer Polytechnic Institute, Troy, NY, 2011. Dr. Clinton's research interests are in the area of radiation detection, both experimental and theoretical modeling, as it applies to nuclear forensics. His expertise includes particle transport, Monte Carlo methods, analog and digital data acquisition and analysis, and detector development. Dr. Clinton is a member of the American Nuclear Society (ANS) as well as the Institute of Electrical and Electronics Engineers (IEEE). Tel. 937-255-6565 x4586, email: Justin.Clinton.ctr@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Invited talk, "Neutron Detection in Nuclear Forensics," Department of Nuclear Engineering, North Carolina State University (Sept 2013).

Invited talk, Nuclear Forensics presentation for the National Technical Nuclear Forensics Center's Annual Academic-Laboratory Collaboration Meeting (Jul 2013).

FIORINO, STEVEN T.,

Director, Center for Directed Energy, and Research Associate Professor of Atmospheric Physics, AFIT
Appointment Date: 2003 (AFIT/ENP); BS, Geography (Climatology), The Ohio State University, 1987; BS, Meteorology, Florida State University, 1989; MS, Atmospheric Dynamics, The Ohio State University, 1993; PhD, Physical Meteorology, Florida State University, 2002. Dr. Fiorino's research interests include retrieving environmental parameters via microwave remote sensing; developing signal processing algorithms to fuse meteorological data collection with non-weather ISR platforms; evaluating uncertainty in high-energy laser engagement due to atmospheric effects; and improving microphysical characterizations for nuclear fallout, transport, and dispersion. He has published broadly in meteorological, directed energy, and military journals. Dr. Fiorino is a member of the American Meteorological Society, American Institute of Aeronautics and Astronautics, the Directed Energy Professional Society, Society of Photo-Instrumentation Engineers (SPIE), and additionally holds a Master of Military Operational Art and Science from Air University (2003). Tel. 937-255-3636 x4506 (DSN 785-3636 x4506), email: Steven.Fiorino@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"2013 AFIT Center for Directed Energy Summer Intern (DESI) Program." Sponsor: HELJTO. Funding: \$50,000 – Fiorino 90%, Perram 5%, Marciniak 5%. [CDE]

"AFIT Support to Propagation Testing with HELSTF SSLTE Phase II." Sponsor: HELJTO. Funding: \$53,000. [CDE]

"Airborne Aero-Optics Lab Beam Control Collection and Evaluation." Sponsor: HELJTO. Funding: \$107,612. [CDE]

"Beam Control for Optical Phased Array Weapons." Sponsor: tOSC. Funding: \$30,000. [CDE]

"CY2013 HEL JTO M&S TAWG Product Development." Sponsor: HELJTO. Funding: \$300,000. [CDE]

"High Energy Laser-Joint Technology Office Predictive Avoidance Subject Matter Expert." Sponsor: HELJTO. Funding: \$25,000. [CDE]

"Jump-Start Verification and Validation Efforts." Sponsor: HELJTO. Funding: \$45,875. [CDE]

"Modification of AFIT Atmospheric Effects Software Code for AFRL/Ry." Sponsor: AFRL/Ry. Funding: \$50,000 – Fiorino 45%, Cusumano 45%, Randall 10%. [CDE]

"Modification of AFIT Atmospheric Effects Software Code for AFRL/Ry." Sponsor: AFRL/Ry. Funding: \$50,000. [CDE]

"Propagation Testing Under Harsh Conditions." Sponsor: HELJTO. Funding: \$40,000. [CDE]

"Research and Development in Directed Energy Applications." Sponsor: MZA. Funding: \$30,000. [CDE]

"Wave Optics of Deep Atmospheric Turbulence: From Underlying Physics towards Predictive Modeling Mitigation and Exploitation." Sponsor: AFOSR. Funding: \$360,000 – Fiorino 55%, Cusumano 45%. [CDE]

REFEREED JOURNAL PUBLICATIONS

Van Zandt, N.R., S.T. Fiorino, and K.J. Keefer, "Enhanced, fast-running scaling law model of thermal blooming and turbulence effects on high energy laser propagation," *Optics Express*, Vol. 21, pp. 14789-14798 (2013). [CDE]

- Krizo, M.J., S.J. Cusumano, S.T. Fiorino, R. Heap, V. Velton, J. Brown, and R.J. Bartell, "Design, development and in-flight testing of a pointer/tracker for in-flight experiments to measure the aero-optical effects over a scaled turret," *Optical Engineering*, Vol. 52, Article No. 071415/1-8 (2013). [CDE]
- Hyde, M.W., S. Basu, M.F. Spencer, S.J. Cusumano, and S.T. Fiorino, "Physical optics solution for the scattering of a partially-coherent wave from a statistically rough material surface," *Optics Express*, Vol. 21, pp. 6807–6825 (2013). [CDE]
- Basu, S., M.W. Hyde, S.J. Cusumano, M.A. Marciniak, and S.T. Fiorino, "Examining the Validity of Using a Gaussian Schell-Model Source to Model the Scattering of a Fully-Coherent Gaussian Beam from a Rough Impedance Surface," *Optical Engineering*, Vol. 52, Article No. 038001/1-9 (2013). [CDE]
- Fiorino, S.T., R.M. Randall, F.J. Echeverria, R.J. Bartell, M.J. Krizo, and S.J. Cusumano, "Effectiveness Assessment of Tactical Laser Engagement Scenarios in the Lower Troposphere," *AIAA Journal of Aerospace Information Systems*, Vol. 10, pp. 32-39 (2013). [CDE]
- Van Zandt, N.R., S.J. Cusumano, R.J. Bartell, S. Basu, J.E. McCrae, S.T. Fiorino, "Comparison of coherent and incoherent laser beam combination for tactical engagements," *Optical Engineering*, Vol. 51, Article No. 104301/1-19 (2013). [CDE]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

- Fiorino S. and L. Burchett., "Measurement of C_n^2 Profiles from Weather Radar Data and other Microwave Signals and Conversion to Visible and NIR C_n^2 Profiles," Propagation through and Characterization of Distributed Volume Turbulence (pcDVT), Proceedings of the Imaging and Applied Optics Conference, Paper No. PTu1F.1 (2013). [CDE]
- Basu S., M.W. Hyde, J.E. McCrae, and S.T. Fiorino, "Scattering from a rough surface in presence of atmospheric turbulence," Proceedings of SPIE Defense, Security and Sensing Symposium, Vol. 8732, Paper No. 87320G (2013). [CDE]
- Van Zandt, N.R., J.E. McCrae, and S.T. Fiorino, "PITBUL: a physics-based modeling package for imaging and tracking of airborne targets for HEL applications including active illumination," Proceedings of SPIE Defense, Security and Sensing Symposium, Vol. 8732, Paper No. 87320H (2013). [CDE]
- McCrae, J.E., N.R. Van Zandt, S.J. Cusumano and S.T. Fiorino, "Simulation of atmospheric turbulence compensation through piston only phase control of a laser phased array," Proceedings of SPIE Defense, Security and Sensing Symposium, Vol. 8733, Paper No. 873311 (2013). [CDE]
- Fiorino, S. T., M.F. Via, K.J. Keefer, S.M. Shirey, J.T. Engel, and B.J. Elmore, "Effectiveness of Using Gridded Forecast Data in Hyperspectral Radiative Transfer Analyses and High Energy Laser Mission Planning," Proceedings of the 93rd American Meteorological Society Annual Meeting, Austin, TX, 6-10 Jan 2013. <https://ams.confex.com/ams/93Annual/webprogram/Paper221761.html>. [CDE]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Chair, HELJTO Modeling and Simulation Technical Area Working Group (M&S TAWG).

Invited talk, "Measurement of C_n^2 Profiles from Weather Radar Data and other Microwave Signals and Conversion to Visible and NIR C_n^2 Profiles," Propagation through and Characterization of Distributed Volume Turbulence (pcDVT), Imaging and Applied Optics Conference, Arlington VA, 24-26 Jun 2013.

FRANZ, ANTHONY L., Lt Col,

Assistant Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, United States Air Force Academy, 1992; MS, Air Force Institute of Technology, 1997;

PhD, University of Maryland, -2007. Lt Col Franz's research focuses on lasers and optics. His recent work has focused on developing light weight diffractive optics for use on satellites. Before joining AFIT, he was a physics faculty member at the Air Force Academy for 8 years and deployed to Iraq and Afghanistan. He has also worked in nuclear treaty monitoring and infrared missile engagement modeling and-simulation. Member of the American Association of Physics Teachers and the American Physical Society. Tel. 937-255-3636 X4429 (DSN 785-3636 x4429), email: Anthony.Franz@afit.edu

GARVIN, MATTHEW B., Capt,

Assistant Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 2011 (AFIT/ENP); BS, Brigham Young University, 1999; MS, Brigham Young University, 2001; MS, University of Virginia, 2003; PhD, Air Force Institute of Technology, 2009. Capt Garvin's recent work has focused on employing time-dependent methods for solving Schrödinger's equation for non-adiabatic systems. Previously, he worked in the Air Force Research laboratory's Directed Energy and Space Vehicles directorates as a scientist and project manager. He holds one patent. Capt Garvin departed AFIT in Aug 2013 and is currently pursuing studies in the Regional Affairs Strategist Intermediate Developmental Education program at the Naval Postgraduate School, Monterey, CA.

GILES, NANCY C.,

Professor of Physics and Head, Department of Engineering Physics, AFIT Appointment Date: 2009 (AFIT/ENP); BS, University of North Carolina at Chapel Hill, 1981; PhD, North Carolina State University, 1987. Professor Giles' research focuses on solid-state physics: photoluminescence (PL), absorption, Raman, and magnetic resonance (EPR) spectroscopy leading to identification of point defects in semiconducting and optical materials; PL excitation and time-resolved PL spectroscopies; nonlinear optical materials; laser-host materials; and scintillators. She is the author of 175 archival publications in refereed journals. Before joining AFIT, she was a physics faculty member at West Virginia University for 19 years. Her current work includes studies of scintillator materials (ZnO:Ga , CdWO_4) for improved detection of nuclear radiation, wide band-gap semiconductors for photorefractive applications, and infrared non-linear optical materials for infrared countermeasures. Member of the Optical Society of America, American Physical Society, and Materials Research Society. Tel. 937-255-3636 x4601 (DSN 785-3636 x4601), email: Nancy.Giles@afit.edu

REFEREED JOURNAL PUBLICATIONS

- A.T. Brant, N.C. Giles, Shan Yang, M.A.R. Sarker, S. Watauchi, M. Nagao, I. Tanaka, D.A. Tryk, A. Manivannan, and L.E. Halliburton, "Ground state of the singly ionized oxygen vacancy in rutile TiO_2 ," *Journal of Applied Physics* Vol. 114, Article No. 113702/1-10 (Sept 2013).
- A.T. Brant, L.E. Halliburton, N.C. Giles, S.A. Basun, A.A. Grabar, and D.R. Evans. "Intrinsic small polarons (Sn^{3+} ions) in photorefractive $\text{Sn}_2\text{P}_2\text{S}_6$ crystals," *Journal of Physics: Condensed Matter* Vol. 25, Article No. 205501/1-5 (May 2013).
- Shan Yang, A.T. Brant, N.C. Giles, and L.E. Halliburton, "Intrinsic small polarons in rutile TiO_2 crystals," *Physical Review B* Vol. 87, Article No. 125201/1-6 (Mar 2013).
- A.T. Brant, N.C. Giles, and L.E. Halliburton, "Insertion of lithium ions into TiO_2 (rutile) crystals: an EPR study of the Li-associated Ti^{3+} small polaron," *Journal of Applied Physics* Vol. 113, Article No. 053712/1-6 (Feb 2013).
- A.T. Brant, L.E. Halliburton, S.A. Basun, A.A. Grabar, S.G. Odoulov, A. Shumelyuk, N.C. Giles, and D.R. Evans, "Photoinduced EPR study of Sb^{2+} ions in photorefractive $\text{Sn}_2\text{P}_2\text{S}_6$ crystals," *Physical Review B* Vol. 86, Article No. 134109/1-6 (Oct 2012).

GROSS, KEVIN C.,

Assistant Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 2008 (AFIT/ENP); BS, Wright State University, 1998; MS, Wright State University, 2001; PhD, Air Force Institute of Technology, 2007. Dr. Gross' research is currently focused on the remote sensing of chemically evolving systems in the battlespace (detonation fireballs, muzzle flashes, rocket and jet engine plumes, smokestack

effluents, etc.) using hyperspectral, spectroscopic, radiometric, and high-speed imagery techniques. Interests also include instrumentation development and methods for decoupling atmospheric attenuation from source emission in spectroscopic measurements of remote targets. He has advised eight MS students and two PhD students, and received several research grants during his first three years on the AFIT faculty. Tel: 937-255-3636 x4558 (DSN 785-3636 x4558), email: Kevin.Gross@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“NASIC Ground Truth Support.” Sponsor: NASIC. Funding: \$147,649. [CTISR]

“Polarimetric Hyperspectral Imagery of Disturbed Earth.” Sponsor: ERDC. Funding: \$250,218. [CTISR]

“Polarimetric HIS for Improved Radioactive Source Detection Sensitivity and Localization Accuracy.”
Sponsor: DTRA. Funding: \$348,581 – Gross 45%, Kowash 45%, Marciniak 5%, McClory 5%.

REFEREED JOURNAL PUBLICATIONS

Christopher A. Rice, Kevin C. Gross, and Glen P. Perram. “Investigation of atmospheric O₂ X³Σ⁻g – b¹Σ⁺g using open path tunable diode laser absorption spectroscopy,” *Applied Physics B: Lasers & Optics*, Vol. 111, pp. 173–182 (2013). <http://dx.doi.org/10.1007/s00340-012-5243-y>; Published online 31-Mar-2013. [CDE]

J. Motos Gordon, Kevin C. Gross, and Glen P. Perram. “Fireball and Shock Wave Dynamics in the Detonation of Aluminized Novel Munitions,” *Combustion, Explosion, and Shock Waves*, Vol. 49, pp. 450–462 (2013). <http://dx.doi.org/10.1134/S0010508213040084>; Published Jul 2013. [CTISR]

Michael R. Rhoby, Jacob L. Harley, Kevin C. Gross, Pierre Tremblay, Martin Chamberland. “Imaging Fourier-Transform Spectrometry for Plume Diagnostics and Code Validation,” *International Journal of Energetic Materials and Chemical Propulsion*, Vol. 12, No. 1, pp. 15–26 (2013). [CTISR]

William J. Palm, Michael A. Marciniak, Glen P. Perram, Kevin C. Gross, and William F. Bailey, “Wavelength- and temperature-dependence of CW laser absorptance in Kapton® thin films,” *Optical Engineering*, Vol. 51, Article No. 121802, Dec 2012. [CDE]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Michael R. Rhoby, Kevin C. Gross, and David L. Blunck, “Imaging Fourier-Transform Spectrometry for Two-Dimensional Scalar Value Measurements in Laminar Flames,” *Proceedings of Combustion Institute – Canadian Section*, pp. 3-9, Spring Technical Meeting, Université Laval, Québec, Canada, 13-16 May 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Invited Paper, “Fourier-transform Spectrometry for Remote Temperature Measurement, Combustion Diagnostics, & Plume Code Validation,” presented at the Defense Threat Reduction Agency’s Workshop on Time-Dependent Temperature Measurements in Post-Detonation Combustion, Chicago, IL, 10-11 Oct 2012.

Invited paper, “Imaging Fourier-Transform Spectrometry for Combustion Diagnostics,” plenary lecture at the Combustion Institute Canadian Section Spring Technical Meeting, Québec City, 13-16 May 2013.

HAGER, GORDON D.,

Research Professor of Chemical Physics, Department of Engineering Physics, AFIT Appointment Date: 2007 (AFIT/ENP); BS, Western Washington University, 1968; PhD, Washington State University, 1973. Professor Hager’s research primarily focuses on high-power chemical and gas phase lasers, including laser device development, characterization, and scaling. His current research emphasizes the spectroscopy and kinetics of diode pumped alkali lasers for tactical weapons applications. He has advised eight MS students, eight PhD

students, and eight postdoctoral researchers. He has published over 50 refereed articles and led the team to demonstrate the first supersonic Chemical Oxygen-Iodine Laser, now the weapon aboard the Airborne Laser.

REFEREED JOURNAL PUBLICATIONS

G. D. Hager and G. P. Perram, "A three level model for alkali metal vapor lasers: Part II. Broadband optical pumping" *Applied Physics B: Lasers & Optics*, Vol. 112, pp. 507-520 (Sept 2013). [CDE]

HAWKS, MICHAEL R.,

Research Assistant Professor of Optical Engineering, Department of Engineering Physics, AFIT Appointment Date: 2008 (AFIT/ENP); BS, Astrophysics, Michigan State University, 1991; MS, Engineering Physics, AFIT, 1993; PhD, Optical Sciences, AFIT, 2006. Dr. Hawks' main research interests include electro-optic and infrared (EO/IR) remote sensing. Specific application areas include monocular passive ranging and hyperspectral and polarimetric imaging. He previously taught at the United States Air Force Academy and has conducted research in chemical lasers, space object identification, chem/bio agent detection, infrared countermeasures, nuclear detonation detection, and other remote sensing applications at the Air Force Research Laboratory and other assignments. He has published 21 technical papers, reports, and presentations. He is a member of the Optical Society of America and the Directed Energy Professional Society, and is a retired USAF Lt Col. Tel. 937-255-3636 x4828 (DSN 785-3636 x4828), email: Michael.Hawks.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

M.R. Hawks, R.A. Vincent, J. Martin, and G.P. Perram, "Short-range demonstrations of molecular passive ranging using O₂(X-b) absorption spectra." *Applied Spectroscopy*, Vol. 67, pp. 513-519 (2013). [CTISR]

HENGHELD, ROBERT L.,

Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1961 (AFIT/ENP); AB, Thomas More College, 1956; MS, University of Cincinnati, 1961; PhD, University of Cincinnati, 1965. Professor Hengehold's research areas center around experimental solid state physics, semiconductor physics, optical diagnostics, and electron and laser spectroscopy. He is the author of over 100 archival publications and over 215 presentations at technical meetings. He has served as advisor on over 17 doctoral dissertations and 80 master's theses. He is currently carrying out studies of (1) depth resolved cathodoluminescent spectroscopy of materials suitable for neutron absorbing semiconductor solid state detectors and (2) optical characterization of compound semiconductor materials and superlattice structures for mid-infrared diode lasers and detectors. This work involves collaborative efforts with the Directed Energy and Sensors Directorates at AFRL and DTRA. Dr. Hengehold received the Air University Commander's Award for Faculty Achievement in 1982, the Gage H. Crocker Outstanding Professor Award in 1996, the Outstanding Professional Achievement Award from the Affiliate Society Council of the Engineering and Science Foundation of Dayton in 1997, and the General Bernard A. Schriever Award in 1999. He was elected a Fellow of the American Physical Society in 2008. Tel. 937-255-3636 x4502 (DSN 785-3636 x4502), email: Robert.Hengehold@afit.edu

REFEREED JOURNAL PUBLICATIONS

C. Dugan, R. L. Hengehold, S. R. McHale, J. A. Colón Santana, J. W. McClory, V. T. Adamiv, Y. V. Burak, Y. B. Losovyj, and P. A. Dowben, "Reversible Mn segregation at the polar surface of lithium tetraborate," *Applied Physics Letters*, Vol. 102, Article No. 161602/1-4 (2013).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Helen C. Jackson, James Petrosky, Gary Farlow, and Robert Hengehold, "Impact of an Optimum Silicon Nitride Passivation Thickness Range on Electron Irradiated AlGaIn/GaN," Proceedings of the 2013 Materials Research Society Spring Meeting (San Francisco, CA), Symposium on Neutron Detection, Paper No. WW1.04, (Apr 2013).

H. Jackson, J. Petrosky, R. Hengehold, and Z. Fang, "Impact of the Variation in Silicon Nitride Passivation Thickness on AlGaIn/AlN/GaN and GaN/AlGaIn/GaN Device Performance," Proceedings of the Tenth International Conference on Nitride Semiconductors, Washington, D.C., Symposium Paper DP1.03 (Aug 2013).

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Honors and Awards Chair, Executive Committee, Ohio Region Section of the American Physical Society.

KOWASH, BENJAMIN R., Maj,

Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2008 (AFIT/ENP); BS, Nuclear Engineering, Oregon State University, 2000; BS, Mechanical Engineering, Oregon State University, 2000; MS, Nuclear Engineering, Air Force Institute of Technology, 2002; PhD, Nuclear Engineering, University of Michigan, 2008. Major Kowash's research interests are in the fields of radiation detection and measurements (emphasis on inverse problems and imaging), nuclear weapon effects, and space nuclear power. His current research considers autonomous radiation detection and imaging systems for the stand-off detection (10-100 meters) of ionizing radiation sources over wide fields of view and in complex background environments. His other interests include modeling and analysis of nuclear weapons effects, inverse problems in detection, adaptive detection systems, radiation shielding, and Mossbauer spectroscopy. He is a member of the American Nuclear Society and IEEE, and maintains an active professional engineering license (nuclear engineering) in the state of Michigan. Tel. 937-255-3636 x4571 (DSN 785-3636 x4571), email: Benjamin.Kowash@afit.edu

REFEREED JOURNAL PUBLICATIONS

J.M. Fitzgerald, L.W. Burggraf, B.R. Kowash, and E.L. Hull, "A Modulating Liquid Collimator for Coded Aperture Adaptive Imaging of Gamma-Rays," *IEEE Transactions on Nuclear Science*, Vol. 60, pp. 2300-2307 (Jun 2013).

PATENTS

FitzGerald, Jack G. M., Larry W. Burggraf, and Benjamin Kowash, "Fully Reconfigurable Liquid Collimator for Gamma and X-Ray Radiation Imaging," Provisional Application for Patent (61817567) submitted 30 Apr 2013.

LEWIS, DOUGLAS R., LTC,

Assistant Professor of Biodefense Science, Department of Engineering Physics, AFIT, Appointment Date: 2012; BS, USAF Academy 1991, MS Pennsylvania State University 1995, PhD, George Mason University 2012. LTC Lewis' previous research focused on genetic components of the insect immune system, genetic response to laser induced damage, peptide capture of biological agents, genetic identification of smallpox, and the organizational factors which have influenced the development of the US Biodefense program. Before joining AFIT, he served 16 years in the US Air Force and 5 years in the US Army to include assignments as an aircraft maintenance officer and as an Assistant Professor of Biology at the Air Force Academy. He also served in counter-WMD positions with the Defense Intelligence Agency (DIA), Air Staff, as an US/UK exchange scientist and with the Defense Threat Reduction Agency (DTRA). His current research is investigating the ability of graphen to serve as a biological detector. His other interest is investigating the possibility of developing a biological collection network based upon native collection entities . Tel. 937-255-3636 x4569 (DSN 785-3636 x4569), email: Douglas.Lewis@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Graphene-Based Low Cost Nanosensor for Sensitive and Selective Detection of Biothreat Agents." Sponsor: AFOSR. Funding: \$18,502.

LI, ALEX G.,

Research Assistant Professor, Department of Engineering Physics, AFIT Appointment Date: 1995 (Research Associate), 2008 (Research Faculty); BS, Changchun University of Science and Technology, 1982; PhD, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Sciences, 1990. Dr. Li has over 20 years of research experience using AFM, SEM, FTIR, Raman, photoluminescence, EPR, ESCA, and XRD to characterize glass, ceramics, semiconductors, polymers, nano-carbon composites, and biological materials. He has published, mostly as the lead author, over two dozen peer-reviewed journal articles, including one top-ten download article of the Institute of Physics (IOP). He also conducted computer modeling of thermal transport and thermal stress in polymers, composites, and other advanced multifunctional materials. Dr. Li invented a novel AFM nano-patterning technique for producing sub-100 nm two-dimensional nanostructures in polymers, and held one patent for a proton conductor material. He was a post-doctoral fellow at Nagoya Institute of Technology and Aichi Institute of Technology prior to working for AFIT in 1995. Dr. Li had taught two core courses, Materials Characterization (MATL 680) and Materials Selection and Processing (MATL 685), for the AFIT materials science program. His current research includes experiment and computer modeling of thermal, mechanical, and electrical properties of granular systems, memristive devices and systems, biomaterials, ceramic matrix composites (CMC), and polymer matrix composites ceramic (PMC). Tel. 937-255-3636 x4576 (DSN 785-3636 x4576), email: Alex.Li@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Tamping-Induced Phase Transitions in Protective Materials for WMD-Related Sensing and Monitoring.”
Sponsor: DTRA. Funding: \$149,192 – Li 75%, Zens 25%.

“Thermal and Mechanical Characterization of Multilayer Thermal Protection Materials.” Sponsor: AFRL/RX.
Funding: \$101,800.

REFEREED JOURNAL PUBLICATIONS

Alex G. Li, Yun Xing, and Larry W. Burggraf, “Thermal Effects on Surface Structures and Properties of Bacillus Anthracis Spores on Nanometer Scales,” *Langmuir*, Vol. 29, pp. 8343–8354 (Published online: Jun 6, 2013).

MAGNUS, AMY L.,

Research Assistant Professor, Department of Engineering Physics, AFIT Appointment Date: 2007 (AFIT/ENP); BSEE, Rochester Institute of Technology, 1990; MSEE, Air Force Institute of Technology, 1995; PhD, Air Force Institute of Technology, 2003. Dr. Magnus conducts and manages research in machine intelligence, near and remote sensing, pattern recognition, network science, and distributed intelligence with particular interest in signal to symbol translations and query based intelligence assessments of sensor management systems. She designs active workspaces for the analysis of kinetic events to ensure authoritative reporting of actionable information. Dr. Magnus has published 11 articles and is writing a book on machine intelligence. She is a retired Major, USAF. Tel. 937-255-3636 x4555 (DSN 785-3636 x4555), email: Amy.Magnus@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Investigation of Glass Materials for Pulsed Power Capacitors.” Sponsor: AFRL/RX. Funding: \$27,000.

“Query Driven Learning Environments.” Sponsor: AFOSR. Funding: \$35,000.

MARCINIAK, MICHAEL A.,

Associate Professor of Physics, Department of Engineering Physics. AFIT Appointment Date: 1999 (AFIT/ENP); BS, St. Joseph’s College, 1981; BSEE, University of Missouri, 1983; MSEE, Air Force Institute of Technology, 1987; PhD, Air Force Institute of Technology, 1995. Professor Marciniak’s research interests include various aspects of light-matter interaction, including (1) polarimetric scatterometry of nanostructured materials, such as photonic crystals, plasmonic materials, and optical meta-materials; (2) bidirectional reflectance distributions for optical signatures; and (3) high-energy laser damage assessment. He has published 21 refereed and 53 other publications and chaired 5 PhD and 46 MS thesis committees. He

is a retired Lt Col, USAF, with 22 years of service. Tel. 937-255-3636 x4529 (DSN 785-3636 x4529), email: Michael.Marciniak@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Dynamic Data-Driven BRDF Measurement System.” Sponsor: AFRL/RV. Funding: \$200,000. [CDE]

“Indirect Photography.” Sponsor: AFOSR. Funding: \$43,827. [CDE]

“Thin-Film Research for Infrared Optical Coatings and Meta-Materials.” Sponsor: DAGSI. Funding: \$43,500. [CDE]

REFEREED JOURNAL PUBLICATIONS

W.J. Palm, M.A. Marciniak, G.P. Perram, K.C. Gross, W.F. Bailey, and C.T. Walters, “Wavelength- and temperature-dependence of CW laser absorptance in Kapton® thin films,” *Optical Engineering*, Vol. 51, Article No. 121802/1-8 (Dec 2012). [CDE]

M.A. Marciniak, S.R. Sellers, R.B. Lamott, and B.T. Cunningham, “Bidirectional scatter measurements of a Guided Mode Resonant Filter photonic crystal structure,” *Optics Express*, Vol. 20, pp. 27242-27252 (Dec 2012). [CDE]

S. Basu, M.W. Hyde IV, S.J. Cusumano, M.A. Marciniak, and S.T. Fiorino, “Examining the validity of using a Gaussian Schell-model source to model the scattering of a fully coherent Gaussian beam from a rough impedance surface,” *Optical Engineering*, Vol. 52, Article No. 038001/1-9 (Mar 2013). [CDE]

J.C. Vap, S.E. Nauyoks and M.A. Marciniak, “Optimization of a tunable infrared Mueller-matrix scatterometer,” *Measurement Science and Technology* Vol. 24, Article No. 055901/1-8 (Mar 2013). [CDE]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

J. Lewoczko, S. Nauyoks and M.A. Marciniak, “Dynamic Data-Driven Bidirectional Reflectance Distribution Function,” *Proceedings of the 15th Annual Directed Energy Annual Symposium*, Albuquerque, NM, 26-30 Nov 2012. [CDE]

C.D. Roberts, R.A. Acosta, M.A. Marciniak and G.P. Perram, “Hyper-spectral and gated ICCD imagery for laser irradiated carbon materials,” *SPIE Photonics West, Proceedings of the SPIE*, Vol. 8603, Paper No. 8603-25 (2013). [CDE]

B.M. Adomanis, D.B. Burckel and M.A. Marciniak, “A characterization study of highly-tailorable 3-D metamaterials in the thermal infrared for selective emission behaviors,” *Proceedings of the SPIE*, Vol. 8806, Paper no. 8806-33 (2013). [CDE]

MATHEWS, KIRK A.,

Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 1987 (AFIT/ENP); BS, California Institute of Technology, 1971; MS, Air Force Institute of Technology, 1982; PhD, Air Force Institute of Technology, 1983. Dr. Mathews’ research interests center on computational methods for neutral particle radiation transport and modeling and analysis of nuclear phenomena and measurements, including enrichment cascade modeling, high altitude radiation transport, blast and shock, nuclear thermal radiation, deconvolution of radiation spectra, and statistical analysis of nuclear measurements. Dr. Mathews has published 20 papers in refereed journals and 21 conference proceedings and chaired 35 theses and 13 dissertations. He is a member of the American Nuclear Society and Tau Beta Pi. Tel. 937-255-3636 x4508 (DSN 785-3636 x4508), email: Kirk.Mathews@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“AFIT Research Supporting Satellite-Based Nuclear Detonation Detection.” Sponsor: NNSA. Funding: \$25,000.

REFEREED JOURNAL PUBLICATIONS

K. Mathews, “Random Sampling from the Lein-Nishina Distribution: Efficiency, Parsimony, and Speed,” *Nuclear Science and Engineering*, Vol. 173, pp. 207-221 (Mar 2013).

MCCLORY, JOHN W.,

Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2008 (AFIT/ENP); BS, Physics, Rensselaer Polytechnic Institute, 1984; MS, Physics, Texas A&M University, 1993; PhD, Nuclear Engineering, Air Force Institute of Technology, 2008. Dr. McClory’s expertise is in radiation effects radiation detector development and nuclear weapon effects. His research includes determining the effect of space and nuclear weapon radiation on electronic and structural materials. It also includes the interaction of radiation with matter, particularly focused on the characterization and improvement of nuclear radiation detectors. He has advised 5 PhD students (2 current) and 21 M.S. students (5 current), received 9 research grants, and published 42 journal articles during his time on the AFIT faculty. He is a member of the IEEE Nuclear and Plasma Sciences Society, American Nuclear Society and Materials Research Society. Tel. 937-255-3636 x7308 (DSN 785-3636 x7308), email: John.McClory@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“AFIT-ENP Research in Support of DTRA Nuclear Technologies.” Sponsor: DTRA. Funding: \$31,000 – McClory 70%, Kowash 30%.

“Rapid Debris Analysis – AFIT.” Sponsor: DTRA. Funding: \$35,000.

REFEREED JOURNAL PUBLICATIONS

J. W. McClory, Q. T. Lu, J. C. Petrosky, S. Mall, “Durability of MWCNT Composites under Electron and Neutron Irradiation,” *Journal of Radiation Effects, Research and Engineering*, Vol. 31, No. 1, pp. 171-180 (Jul 2013).

J. W. Englert, J.C. Petrosky, W. F. Bailey, J.W. McClory, A. Heger, L. Tauxe, D. R. Watts, “Estimating Peak EMP Magnetic Fields Using Alternating Field Demagnetization,” *Journal of Radiation Effects, Research and Engineering*, Vol. 31, No. 1, pp. 85-93 (Jul 2013).

M. R. Halstead, S. Lee, J. Petrosky, A. Bickley, J. W. McClory, S. Clark, P. Sokol, “Neutron Flux Spectrum Characterization of a Compact, Accelerator-Driven Neutron Source at Indiana University,” *Journal of Radiation Effects, Research and Engineering*, Vol. 31, No. 1, pp. 117-123 (Jul 2013).

A.A. Bickley, M.R. Halstead, J.W. McClory, S. Lee, P. Sokol, J.C. Petrosky, “Evaluation of the Neutron Energy Spectrum Produced at the Neutron Radiation Effects Beam Line Utilizing a Computational Monte Carlo Approach,” *Journal of Radiation Effects, Research and Engineering*, Vol. 31, No. 1, pp. 23-27 (Jul 2013).

A. T. Brant, D. A. Buchanan, J. W. McClory, P. A. Dowben, V. T. Adamiv, Ya. V. Burak, and L. E. Halliburton, “EPR identification of defects responsible for thermoluminescence in Cu-doped lithium tetraborate ($\text{Li}_2\text{B}_4\text{O}_7$) crystals,” *Journal of Luminescence*, Vol. 139, pp 125-131 (Jul 2013).

T. D. Kelly, L. Kong, D. A. Buchanan, A. T. Brant, J. C. Petrosky, J. W. McClory, V. T. Adamiv, Y. V. Burak, and P. A. Dowben, “EXAFS and EPR analysis of the local structure of Mn-doped $\text{Li}_2\text{B}_4\text{O}_7$,” *Physica Status Solidi (b)*, Vol. 250, Issue 7, pp 1376-1383 (Jul 2013).

J.A.C. Santana, C.M. Young, J.W. McClory, J.C. Petrosky, X. Wang, P. Liu, J.K. Tang, V.T. Adamiv, Y.V. Burak, K. Fukutani, P.A. Dowben, "Gamma and X-ray sensitivity of Gd₂O₃ heterojunctions," *Radiation Measurements*, Vol. 51-52, pp 99-102 (Apr-May 2013).

Christina Dugan, R. Hengehold, Stephen R. McHale, Juan A. Colón Santana, John W. McClory, V.T. Adamiv, Ya.V. Burak, Ya. B. Losovyj and Peter A. Dowben, "Reversible Mn segregation at the polar surface of lithium tetraborate," *Applied Physics Letters*, Vol. 102, Article No. 161602 (4 pages) (Apr 2013).

Lu Wang, Wai-Ning Mei, S. R. McHale, J. W. McClory, J. C. Petrosky, J. Wu, R. Palai, Ya. B. Losovyj, and P. A. Dowben, "The rare earth 4f hybridization with the GaN valence band," *Semiconductor Science and Technology*, Vol. 27, Article No. 115017 (7 pages) (Oct 2012).

J.A. Colón Santana, Pan Liu, Xianjie Wang, J. Tang, S.R. McHale, D. Wooten, J.W. McClory, J.C. Petrosky, J. Wu, R. Palai, Ya. B. Losovyj, and P.A. Dowben, "The Local Metallicity of Gadolinium doped Compound Semiconductors," *Journal of Physics: Condensed Matter*, Vol. 24, Article No. 445801 (6 pages) (Oct 2012).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

T. D. Kelly, J. C. Petrosky, J. W. McClory, T. Zens, D. Turner, J. Matthew Mann, Joseph W. Kolis, Juan A. Colón Santana and Peter A. Dowben, "The Debye Temperature for Hydrothermally Grown ThO₂ Single Crystals", *Materials Research Society Symposium Proceedings*, Vol. 1576-Nuclear Radiation Detection Materials (Aug 2013).

J. S. Best, J. W. McClory, C. D. Cress, S. A. Francis, J. C. Petrosky, "Electron Radiation Damage Effects on Single-Walled Carbon Nanotube Thin Films," *IEEE Nuclear Science Symposium 2012*, Paper No. N33-7, Anaheim CA, 1 Nov 2012.

M. A. Ford, A. A. Bickley, S. R. McHale, J. W. McClory, J. C. Petrosky, "Application of LiF Coated Diodes to Neutron Spectroscopy for Thermal through Fast Energies," Paper No. N1-93, *IEEE Nuclear Science Symposium 2012*, Anaheim CA, 29 Oct 2012.

M. R. Halstead, J. C. Petrosky, J. W. McClory, S. Clark, P. E. Sokol, "Considerations for Neutron Irradiation when Using Constant and Pulsed Sources," Paper No. N14-6, *IEEE Nuclear Science Symposium 2012*, Anaheim CA, 30 Oct 2012

S. B. Fagan-Kelly, C. S. Williams, D. A. Buchanan, J. W. McClory, A. M. Bonavita, S. M. Jimenez, L. W. Burggraf, "Positron Annihilation Momentum Spectroscopy of Nuclear Detection Materials: Coincident Angular Correlation of Annihilation Radiation / Doppler Broadening of Annihilation Radiation (ACAR/DBAR)," *IEEE Nuclear Science Symposium 2012*, Paper No. N20-8, Anaheim CA, 31 Oct 2012.

J. W. McClory, S. R. McHale, Lu Wang, Wai-Ning Mei, J. C. Petrosky, J. Wu, R. Palai, Ya. B. Losovyj, and P. A. Dowben, "The rare earth 4f hybridization in gallium nitride," *American Vacuum Society 59th Annual Symposium and Exhibition*, Actinides and Rare Earths Session, Invited Paper No. AC+TF+SS+MI-MoA1, Tampa FL, 29 Oct 2012.

T. D. Kelly, J. W. McClory, D. A. Buchanan, A. T. Brant, J. C. Petrosky, Ya. B. Losovyj, V. T. Adamiv, Ya. V. Burak, and P. A. Dowben, "Investigation of rare earth doped lithium tetraborate glasses with XAFS and emission and excitation spectroscopy," *American Vacuum Society 59th Annual Symposium and Exhibition*, Actinides and Rare Earths Session, Paper No. AC+TF+SS+MI-MoA7, Tampa FL, 29 Oct 2012

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Tony D. Kelly, James Petrosky, John W. McClory, Timothy Zens, David Turner, James Mann, Joseph Kolis, Juan A. Colón Santana, and Peter A. Dowben, "The Debye Temperature for Hydrothermally Grown ThO₂

Single Crystals,” 2013 Material Research Society Spring Meeting, Paper No. WW10.03, San Francisco CA, 4 Apr 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Co-Chair, 2013 CBRN Symposium held at AFIT, 2-4 Apr 2013.

Faculty Advisor – AFIT Student Chapter of the American Nuclear Society.

Member Joint National Security Applications Council-Peer Review Panel (JNSAC-PRP). The role of the JNSA-PRP is to review proposals for the Department of Energy’s National Ignition Facility and evaluate them based on their likelihood of achieving the defined programmatic and scientific objectives.

Presented briefing to the Assistant Secretary of Defense for NBC Defense Programs on the AFIT Combating WMD M.S. program in Dec 2012.

MCHALE, STEPHEN R., LTC,

Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2011 (AFIT/ENP); BS, Engineering Physics, United States Military Academy at West Point, 1994; MS, Nuclear Engineering, Air Force Institute of Technology, 2006; PhD, Nuclear Engineering, Air Force Institute of Technology, 2011. He has been an Army officer since 1994 serving in the United States and Asia. LTC McHale’s research focuses on radiation detection materials, nuclear weapons effects, and radiation effects on electronic devices. Member of the American Nuclear Society and Tau Beta Pi. Tel. 937-255-3636 x4438 (DSN 785-3636 x4438), email: Stephen.McHale@afit.edu

REFEREED JOURNAL PUBLICATIONS

C.L. Dugan, R.L. Hengehold, S.R. McHale, J.A. Colón Santana, J.W. McClory, V.T. Adamiv, Ya. V. Burak, Ya. B. Losovyj, P.A. Dowben, “Reversible Mn segregation at the polar surface of lithium tetraborate,” *Applied Physics Letters*, Vol. 102, Article No. 161602 (Apr 2013).

L.Wang, W. Mei, S.R. McHale, J.W. McClory, J.C. Petrosky, J.Wu, R. Palai, Ya. B. Losovyj, P.A. Dowben, “The rare earth 4f hybridization with the GaN valence band,” *Semiconductor Science and Technology*, Vol. 27, 115017 (Nov 2012).

J.A. Colón Santana, P. Liu, X. Wang, J. Tang, S.R. McHale, D. Wooten, J.W. McClory, J.C. Petrosky, J. Wu, R. Palai, Ya. B. Losovyj, P.A. Dowben, “The local metallicity of gadolinium doped compound semiconductors,” *Journal of Physics - Condensed Matter*, Vol. 24, Article No. 445801 (Nov 2012).

NAUYOKS, STEPHEN E.,

Visiting Assistant Professor, Department of Engineering Physics, AFIT Appointment Date: 2010 (AFIT/ENP); BS, Applied Mathematics, 2002; MS, Applied Mathematics, New Jersey Institute of Technology, Newark, NJ, 2004; PhD, Physics, Texas Christian University, Fort Worth, TX, 2009. Dr. Nauyoks has been modifying a CASI system to be able to run full polarimetric scatterometry analysis using lasers at variable wavelengths of unique materials with nano and micron sized structures. Dr. Nauyoks is a member of the Society of Photo-Instrumentation Engineers (SPIE). Tel. 937-255-6565 x7501, email: Stephen.Nauyoks@afit.edu

REFEREED JOURNAL PUBLICATIONS

J.C. Vap, S.E. Nauyoks and M.A. Marciniak, “Optimization of a tunable infrared Mueller-matrix scatterometer,” *Measurement Science and Technology* Vol. 24, Article No. 055901/1-8 (Mar 2013). [CDE]

PERRAM, GLEN P.,

Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1989 (AFIT/ENP); BS, Cornell University, 1980; MS, Air Force Institute of Technology, 1981; PhD, Air Force Institute of Technology, 1986.-Dr. Perram's research interests include high power chemical lasers, optically pumped gas phase lasers, laser – material interactions, hyperspectral imaging, reaction kinetics, atomic and molecular spectroscopy, environmental science, photochemistry, optical diagnostics, and remote sensing. He has advised 29 PhD and 46 MS students, received 45 research grants, and published over 75 journal articles during his 24 years on the AFIT faculty. Tel. 937-255-3636 x4504 (DSN 785-3636 x4504), email: Glen.Perram@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Diode Pumped Rare Gas Lasers.” Sponsor: HELJTO. Funding: \$249,664. [CDE]

“HEL Analysis Tool with Experimentally Corroborated DPAL Rate Constants.” Sponsor: MDA. Funding: \$13,783. [CDE]

“Merging Hyperspectral Imagery and Multi-Scale Modeling for Laser Lethality.” Sponsor: AFOSR. Funding: \$463,811 – Perram 80%, Marciniak 20%. [CDE]

“Pulsed Detonation Driven Gas Dynamic Laser.” Sponsor: AFRL/RQ. Funding: \$53,000. [CDE]

“Rubidium Vapor Circulation System: Optical Diagnostics.” Sponsor: MDA. Funding: \$4,804. [CDE]

“Validated Atmospheric Propagation for Diode Pumped Alkali Lasers.” Sponsor: HELJTO. Funding: \$62,000. [CDE]

REFERRED JOURNAL PUBLICATIONS:

J. D. Hewitt, T. J. Houlahan, Jr., J. E. Gallagher, D. L. Carroll, A. D. Palla, J. T. Verdeyen, G. P. Perram, and J. G. Eden, “Role of Excited State Photoionization in the 852.1 nm Cs Laser Pumped by Cs-Ar Photoassociation,” *Applied Physics Letters*, Vol. 102, Article No. 111104 (Mar 2013). [CDE]

Kirk C. Brown and Glen P. Perram “Demonstration of a 459-nm pulsed, optically-pumped cesium vapor laser,” *Optics Communications*, Vol. 300, pp. 51–57 (Jul 2013). [CDE]

Christopher A. Rice, Gordon Lott and Glen P. Perram, “Open-path atmospheric transmission for the diode pumped cesium laser,” *Applied Optics*, Vol. 51, pp. 8102–8110 (Feb 2013). [CDE]

Michael R. Hawks, R. Anthony Vincent, Jacob Martin, and Glen P. Perram, "Short-range demonstrations of monocular passive ranging using O₂(X-b) absorption spectra," *Applied Spectroscopy*, Vol. 67, pp. 513–519 (May 2013). [CTISR]

Bryan J. Steward, Kenneth B. Bauer, and Glen P. Perram “Remote discrimination of large caliber gun firing signatures,” *Journal of Applied Remote Sensing*, Vol. 6, Article No. 063607 (Dec 2012). [CTISR]

Randall L. Bostick and Glen P. Perram "Hyperspectral image reconstruction of an array of extended targets using chromotomosynthesis," *Optical Engineering*, Vol. 51, Article No. 103205 (Oct 2012). [CTISR]

Randall L. Bostick and Glen P. Perram “Classification of visible point sources using hyperspectral chromotomosynthetic imagery,” *Journal of Applied Remote Sensing*, 6(1), Article No. 063584-1 (Oct 2012). [CTISR]

Christopher A. Rice, Kevin C. Gross, and Glen P. Perram, “Investigation of atmospheric O₂ X – b using open-path tunable diode laser absorption spectroscopy,” *Applied Physics B*, Vol. 111, pp. 173-182 (May 2013). [CDE]

J. Motos Gordon, Kevin C. Gross, Glen P. Perram, “Fireball and shock wave dynamics in the detonation of aluminized novel munitions,” *Combustion, Explosion, and Shock Waves*, Vol. 49, pp. 450-462 (Jul 2013). [CTISR]

William J. Palm, Michael A. Marciniak, Glen P. Perram, Kevin C. Gross, and William F. Bailey, “Wavelength- and temperature-dependence of CW laser absorptance in Kapton® thin films,” *Optical Engineering*, Vol. 51, Article No. 121802, Dec 2012. [CDE]

G. D. Hager and G. P. Perram, “A three level model for alkali metal vapor lasers: Part II. Broadband optical pumping,” *Applied Physics B*, Vol. 112, pp. 507-520 (Sep 2013). [CDE]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW:

Charles D. Roberts, Roberto A. Acosta, Michael A. Marciniak and Glen P. Perram, “Hyperspectral and gated ICCD imagery for laser irradiated carbon materials,” Photonics West, *Proceedings of the SPIE*, Vol. 86030Q, 2-7 Feb 2013, San Francisco, CA. [CDE]

Christopher A. Rice, Matthew Guy and Glen P. Perram, “Effects of atmospheric transmission of high power diode pumped alkali lasers,” Photonics West, *Proceedings of the SPIE*, Vol. 86100S, 2-7 Feb 2013, San Francisco, CA. [CDE]

Jeffrey E. Gallagher and Glen P. Perram, “Two photon absorption and Stimulated Raman Scattering in alkali vapor lasers,” Photonics West, *Proceedings of the SPIE*, Vol. 8604-3, 2-7 Feb 2013, San Francisco, CA. [CDE]

PETROSKY, JAMES C.,

Associate Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2000 (AFIT/ENP); BA, Engineering Physics/Computer Science, Millersville University of Pennsylvania, 1984; MS, Engineering Physics, Rensselaer Polytechnic Institute, 1992; PhD, Engineering Physics, Rensselaer Polytechnic Institute, 1995. Dr. Petrosky has expertise in radiation effects on electronic devices, EMP, experimental design, radiation detection, and nuclear weapon effects. His research spans narrow and wide band gap materials using combinations of electrical, optical, and absorption spectroscopy to gain information on the damaging effects of ionizing and non-ionizing radiation. Experimental techniques include I-V(T), C-V(T), photoluminescence spectroscopy, Hall Effect, and Electron Paramagnetic Resonance spectroscopy (EPR); applications of measurement techniques in harsh environments/in-situ measurements; and obtaining real-time data. Applications include electronic switches and actuators, RF/IR sensors, force transducers, and electronics controls for use in the space and nuclear weapons environment. Tel. 937-255-3636 x4562 (DSN 785-3636 x4562), email: James.Petrosky@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

“DTRA GNE Student Support.” Sponsor: DTRA. Funding: \$27,940.

SPONSOR FUNDED RESEARCH PROJECTS

“Analysis of Carbon Nanotube Based Structural Components for Space Vehicle Structures.” Sponsor: AS&T. Funding: \$87,674 – Petrosky 25%, McClory 25%, Li 25%, Mall 25%.

“Nuclear Survivability, Experimentation, Modeling and Data Verification.” Sponsor: AFNWC. Funding: \$140,000 – Petrosky 30%, McClory 35%, Kowash 35%.

“Support Activities to Homeland Security.” Sponsor: DHS. Funding: \$150,000 – Petrosky 90%, Hengehold 10%.

REFEREED JOURNAL PUBLICATIONS

- J. W. McClory, Q. T. Lu, J. C. Petrosky, S. Mall, ‘Durability of MWCNT Composites under Electron and Neutron Irradiation,’ *Journal of Radiation Effects, Research and Engineering*, Vol. 31, No. 1, pp. 171-180 (Jul 2013).
- J. W. Englert, J.C. Petrosky, W. F. Bailey, J.W. McClory, A. Heger, L. Tauxe, D. R. Watts, ‘Estimating Peak EMP Magnetic Fields Using Alternating Field Demagnetization,’ *Journal of Radiation Effects, Research and Engineering*, Vol. 31, No. 1, pp. 85-93 (Jul 2013).
- M. R. Halstead, S. Lee, J. Petrosky, A. Bickley, J. W. McClory, S. Clark, P. Sokol, ‘Neutron Flux Spectrum Characterization of a Compact, Accelerator-Driven Neutron Source at Indiana University,’ *Journal of Radiation Effects, Research and Engineering*, Vol. 31, No. 1, pp. 117-123 (Jul 2013).
- A.A. Bickley, M.R. Halstead, J.W. McClory, S. Lee, P. Sokol, J.C. Petrosky, ‘Evaluation of the Neutron Energy Spectrum Produced at the Neutron Radiation Effects Beam Line Utilizing a Computational Monte Carlo Approach,’ *Journal of Radiation Effects, Research and Engineering*, Vol. 31, No. 1, pp. 23-27 (Jul 2013).
- T. D. Kelly, L. Kong, D. A. Buchanan, A. T. Brant, J. C. Petrosky, J. W. McClory, V. T. Adamiv, Y. V. Burak, and P. A. Dowben, ‘EXAFS and EPR analysis of the local structure of Mn-doped $\text{Li}_2\text{B}_4\text{O}_7$,’ *Physica Status Solidi (b)*, Vol. 250, Issue 7, pp 1376-1383 (Jul 2013).
- J.A.C. Santana, C.M. Young, J.W. McClory, J.C. Petrosky, X. Wang, P. Liu, J.K. Tang, V.T. Adamiv, Y.V. Burak, K. Fukutani, P.A. Dowben, ‘Gamma and X-ray sensitivity of Gd_2O_3 heterojunctions,’ *Radiation Measurements*, Vol. 51-52, pp 99-102 (Apr-May 2013).
- Lu Wang, Wai-Ning Mei, S. R. McHale, J. W. McClory, J. C. Petrosky, J. Wu, R. Palai, Ya. B. Losovjy, and P. A. Dowben, ‘The rare earth 4f hybridization with the GaN valence band,’ *Semiconductor Science and Technology*, Vol. 27, Article No. 115017 (7 pages) (Oct 2012).
- J.A. Colón Santana, Pan Liu, Xianjie Wang, J. Tang, S.R. McHale, D. Wooten, J.W. McClory, J.C. Petrosky, J. Wu, R. Palai, Ya. B. Losovjy, and P.A. Dowben, ‘The Local Metallicity of Gadolinium doped Compound Semiconductors,’ *Journal of Physics: Condensed Matter*, Vol. 24, Article No. 445801 (6 pages) (Oct 2012).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

- T. D. Kelly, J. C. Petrosky, J. W. McClory, T. Zens, D. Turner, J. Matthew Mann, Joseph W. Kolis, Juan A. Colón Santana and Peter A. Dowben, ‘The Debye Temperature for Hydrothermally Grown ThO_2 Single Crystals’, *Materials Research Society Symposium Proceedings*, Vol. 1576-Nuclear Radiation Detection Materials (Aug 2013).
- Jacob Castilow, Colin D. McMillen, James M. Mann, Joseph Kolis, James Petrosky, Timothy W Zens, David Turner, ‘Hydrothermal Synthesis and Characterization of ThO_2 , $\text{U}_x\text{Th}_{1-x}\text{O}_2$, and UO_x ,’ *Proceedings of the 2013 Materials Research Society Spring Meeting*, Vol. 1576- Nuclear Radiation Detection Materials, Paper No. WW3.06 (Aug 2013).
- J. S. Best, J. W. McClory, C. D. Cress, S. A. Francis, J. C. Petrosky, ‘Electron Radiation Damage Effects on Single-Walled Carbon Nanotube Thin Films,’ *IEEE Nuclear Science Symposium 2012*, Paper No. N33-7, Anaheim CA, 1 Nov 2012.
- M. A. Ford, A. A. Bickley, S. R. McHale, J. W. McClory, J. C. Petrosky, ‘Application of LiF Coated Diodes to Neutron Spectroscopy for Thermal through Fast Energies,’ Paper No. N1-93, *IEEE Nuclear Science Symposium 2012*, Anaheim CA, 29 Oct 2012.

M. R. Halstead, J. C. Petrosky, J. W. McClory, S. Clark, P. E. Sokol, "Considerations for Neutron Irradiation when Using Constant and Pulsed Sources," Paper No. N14-6, *IEEE Nuclear Science Symposium 2012*, Anaheim CA, 30 Oct 2012.

J. W. McClory, S. R. McHale, Lu Wang, Wai-Ning Mei, J. C. Petrosky, J. Wu, R. Palai, Ya. B. Losovyj, and P. A. Dowben, "The rare earth 4f hybridization in gallium nitride," *American Vacuum Society 59th Annual Symposium and Exhibition*, Actinides and Rare Earths Session, Invited Paper No. AC+TF+SS+MI-MoA1, Tampa FL, 29 Oct 2012.

T. D. Kelly, J. W. McClory, D. A. Buchanan, A. T. Brant, J. C. Petrosky, Ya. B. Losovyj, V. T. Adamiv, Ya. V. Burak, and P. A. Dowben, "Investigation of rare earth doped lithium tetraborate glasses with XAFS and emission and excitation spectroscopy," *American Vacuum Society 59th Annual Symposium and Exhibition*, Actinides and Rare Earths Session, Paper No. AC+TF+SS+MI-MoA7, Tampa FL, 29 Oct 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Tony D. Kelly, James Petrosky, John W. McClory, Timothy Zens, David Turner, James Mann, Joseph Kolis, Juan A. Colón Santana, and Peter A. Dowben, "The Debye Temperature for Hydrothermally Grown ThO₂ Single Crystals," *2013 Material Research Society Spring Meeting*, Paper No. WW10.03, San Francisco CA, 4 Apr 2013.

Helen C. Jackson, James Petrosky, Gary Farlow, and Robert Hengehold, "Impact of an Optimum Silicon Nitride Passivation Thickness Range on Electron Irradiated AlGaIn/GaN," *Proceedings of the 2013 Materials Research Society Spring Meeting (San Francisco, CA), Symposium on Neutron Detection*, Paper No. WW1.04, (Apr 2013).

H. Jackson, J. Petrosky, R. Hengehold, and Z. Fang, "Impact of the Variation in Silicon Nitride Passivation Thickness on AlGaIn/AlN/GaN and GaN/AlGaIn/GaN Device Performance," *Proceedings of the Tenth International Conference on Nitride Semiconductors*, Washington, D.C., Symposium Paper DP1.03 (Aug 2013).

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Member, Standing Committee on Advanced and Renewable Energy Masters Degree Program, UD/WSU.

Chairman, QASPR (Qualification Alternatives to the Sandia Pulsed Reactor) review Committee, DOE.

Member, REHEDS (Radiation Effects and High Energy Density Sciences), DOE.

Curriculum Chair, AFIT Nuclear Engineering M.S. program.

Paper Reviewer: HEART Conference/Journal of Radiation Effects, NIMA (Nuclear Instrumentation and Methods), JVS (Journal of Vacuum Sciences).

Proposal Reviewer: Sandia National Labs Laboratory Directed Research & Development projects 2014.

RIES, HEIDI R.,

Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1999 (AFIT/ENP); Dean for Research, Graduate School of Engineering and Management (AFIT/ENR); Interim Dean, Graduate School of Engineering and Management; BS, Physics, The Ohio State University, 1982; MS, Physics, The Ohio State University, 1984; PhD, Applied Physics, Old Dominion University, 1987. Dr. Ries serves as AFIT's chief research officer, primary liaison to the Air Force Research Laboratory, and served as Interim Dean during FY13. Dr. Ries' research interests include radiation effects, nonlinear optical materials, electron paramagnetic resonance spectroscopy, and laser processing of materials. Prior to joining the AFIT faculty, Dr. Ries served as Director of the Center for Materials Research at Norfolk State University in Norfolk, Virginia, and Associate Director of the Applied Research Center at the Jefferson Center for Research and

Technology Research Park in Newport News, Virginia. Dr Ries was elected to the ASEE Engineering Research Council Board of Directors in 2008, and served a two-year term as Secretary/Treasurer (2011-2013.) She has served on the Engineering and Science Foundation of Dayton Board since 2005, and as its Secretary/Treasurer since 2012. She was recognized by the Dayton Daily News as one of the region's 2009 Ten Top Women, and was the Air Force's civilian winner of the 2011 Department of Defense Women's History Month Foreign Language and Science, Technology, Engineering and Math (STEM) Role Model Award. Tel. 937-255-3636 x4544 (DSN 785-3636 x4544), email: Heidi.Ries@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"AFRL-AFIT MOA Partnership Agreement #1." Sponsor: AFOSR. Funding: \$15,602.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Eligibility and Specialized Reviewer, Higher Learning Commission of the North Central Association.

Board of Directors and Secretary/Treasurer, ASEE Engineering Research Council.

Board of Trustees and Secretary, Martin University, Indianapolis, IN.

Board of Directors and Secretary, Engineering and Science Foundation of Dayton.

TOM, BRIAN A., COL,

Associate Dean, Graduate School of Engineering and Management, and Assistant Professor of Chemical Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, Chemistry (Cum Laude), University of California, San Diego, 1991; Masters of Administrative Science (Organizational Management), George Washington University, 1999; MS in Applied Physics, AFIT, 2006; PhD, Chemical Physics, University of Illinois at Urbana-Champaign, 2009. Col Tom's current research involves the use of spectroscopic methods to measure the physical conditions in the exhaust of novel propulsion systems. As Associate Dean he supervises all support and administrative functions in the graduate school, made up of six academic departments with 285 faculty and staff. He is responsible for the professional development of over 70 PhD officers, and the academic progress of more than 800 students. He also oversees institutional advancement, outreach and marketing for AFIT, as well as flight test planning and safety for AFIT's remotely piloted vehicle programs. Previously, he was Assistant Professor and Deputy Head of Operations in the Department of Chemistry at USAFA. Tel. 937-255-3636 x7112 (DSN 937-785-3636 x7112), email: Brian.Tom@afit.edu

TUTTLE, RONALD F.,

Associate Professor of Nuclear Engineering, Department of Engineering Physics, AFIT Appointment Date: 2001 (AFIT/ENP); BS, Chemical Engineering, University of Missouri (Columbia), 1968; MS, Nuclear Engineering, University of Missouri (Columbia), 1970; PhD, Nuclear Engineering, University of Missouri (Columbia), 1980. Dr. Tuttle's research areas include applications of active and passive remote sensing, spectroscopy, diagnostics, and signals processing to problems in intelligence collection and exploitation. Other areas of interest include nuclear weapon effects and space nuclear power systems modeling and mechanics of aerosols. He has published in both unclassified and classified refereed archival journals and conference proceedings. Dr. Tuttle served as Director, Center for Technical Intelligence Studies and Research (CTISR), AFIT, until Aug 2012. Tel. 937-255-3636 x4536 (DSN 785-3636 x4536), email: Ronald.Tuttle@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Borel-Donohue, C.C., Bunker, D.J., Tuttle, R.F., Barki, A.N. and Gilbreath, G.C., "Multimodal Gait Signatures and Motion Studies," 2012 Joint Meeting of the Military Sensing Symposia (MSS) Specialty Group On "Advanced Signatures Technology Symposium (ASTS)," MSS-JOINT-12-041, Paper B104 (Oct, 2012). [CTISR]

Kendricks, K., Barki, A.N., Tuttle, R.F., Bunker, D.J., Borel-Donohue, C.C., “An inverse-kinematic approach using Groebner basis theory applied to gait cycle analysis,” *Proceedings of the SPIE Defense, Security and Sensing Symposium*, Vol. 8734, Paper 8734-22 (2013). [CTISR]

WACKER, ROBERT S., Lt Col,

Assistant Professor of Atmospheric Science, Deputy Department Head, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, United States Air Force Academy, 1995; MS, Texas A&M University, 1997; PhD, University of Wisconsin-Madison, 2005. Lt Col Wacker's research covers a wide range of topics in the atmospheric sciences. His recent work has focused on lightning detection, microwave remote sensing of tropical cyclones, and aviation weather. Before joining AFIT, he was a Physics faculty member at the United States Air Force Academy, Director of Operations of the 21st Operational Weather Squadron, and the International Security Assistance Force (ISAF) Chief Meteorology Officer in Afghanistan. He is a member of the American Meteorological Society and the Air Weather Association. Tel. 937-255-3636 x4609 (DSN 785-3636 x4609), email: Robert.Wacker@afit.edu

WALLI, KARL C., Lt Col,

Assistant Professor of Engineering Physics, Department of Engineering Physics, AFIT Appointment Date: 2010 (AFIT/ENP); BS, Electrical Engineering, Michigan Technological University; MS, Strategic Intelligence, National Defense Intelligence College, 1995; MS, Imaging Science, Rochester Institute of Technology, 2003; PhD, Imaging Science, Rochester Institute of Technology, 2010. Lt Col Walli has been assigned to the National Reconnaissance Office on two separate occasions, where he helped acquire the country's next generation of Space Imaging systems. Additionally, he has been involved with Measurement and Signatures Intelligence (MASINT)-related remote sensing for 10 years, serving both in DIA's Central MASINT Organization and the National Air and Space Intelligence Center and within EUCOM's 26th Intelligence Group. He has published and presented his research into automatic image registration techniques at SPIE, IEEE, and ASPRS conferences. Lt Col Walli departed AFIT in Jul 2013 and is currently the Technical Director, Advance Technology Office, Advanced Systems and Technology Directorate, National Reconnaissance Office.

SPONSOR FUNDED RESEARCH PROJECTS

“Physics Based NUDET Modeling,” Sponsor: NNSA. Funding: \$25,000 – Walli 75%, Bunker 25. [CTISR]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

J.M. Ekholm, K.C. Walli, and J.D. Hendrix, “Optimizing Computer Vision-based Scene Reconstruction from Aerial Vehicles,” *Proceedings of the Applied Imagery Pattern Recognition Workshop (AIPR)*, 2012 IEEE (Oct 2012). [CTISR]

R.N. Givens, K.C. Walli, M.T. Eismann, “Fusion of LIDAR data with hyperspectral and high-resolution imagery for automation of DIRSIG scene generation,” *Proceedings of the Applied Imagery Pattern Recognition Workshop (AIPR)*, 2012 IEEE (Oct 2012). [CTISR]

J.C. Florio, K.C. Walli, J.A. Jackson, M. Gartley, “Comparison of DIRSIG-Simulated Synthetic Aperture Radar Scattering with Parametric Models and Measured Data,” *Proceedings of the Applied Imagery Pattern Recognition Workshop (AIPR)*, 2012 IEEE (Oct 2012). [CTISR]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AIPR, Committee Member and Session Co-Chair, 2013. [CTISR]

WEEKS, DAVID E.,

Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1993 (AFIT/ENP); BA, Physics with honors, Colgate University, 1983; MS, Physics, Georgia Institute of Technology, 1985; PhD, Physics, University of Arkansas, 1989. Dr. Weeks' research interests include the development of time dependent wave packet methods to model the quantum mechanics of simple chemical reactions and compute

associated state to state reactive scattering matrix elements. Of particular interest are new methods that incorporate non-adiabatic coupling between electronic and nuclear degrees of freedom. Tel. 937-255-3636 x4561 (DSN 785-3636 x4561), email: David.Weeks@afit.edu

WEIDNER, JOHN W., LTC,

Research Assistant Professor of Nuclear Engineering, Department of Engineering Physics, AFIT
Appointment Date: 2012 (AFIT/ENP); B.S., Applied Physics, St. John's University, Collegeville, MN, 1991; M.S., Engineering Management, University of Missouri-Rolla, 1996; M.S., Nuclear Engineering, University of Wisconsin-Madison, 2003; M.S., Medical Physics, University of Wisconsin-Madison, 2003; PhD, Medical Physics, University of Wisconsin-Madison, 2012. LTC Weidner is assigned to the Defense Threat Reduction Agency (DTRA) and manages a DTRA-sponsored research program in AFIT/ENP that spans the areas of nuclear detection, forensics, survivability and effects. LTC Weidner is a registered professional engineer in the state of Wisconsin and previously served as an Assistant Professor in the Department of Physics and Nuclear Engineering at the United States Military Academy, West Point, NY. He is the author of five publications in refereed journals. LTC Weidner departed AFIT in Jul 2013 and is currently a student at the Army War College, Carlisle Barracks, PA.

REFEREED JOURNAL PUBLICATIONS

J.W. Weidner, S.G. Mashnik, K.D. John, B. Ballard, E.R. Birnbaum, L.J. Bitteker, A. Couture, M.E. Fassbender, G.S. Goff, R. Gritz, F.M. Hemez, W. Runde, J.L. Ullmann, L.E. Wolfsberg, and F.M. Nortier, "²²⁵Ac and ²²³Ra Production via 800 MeV Proton Irradiation of Natural Thorium Targets." *Applied Radiation and Isotopes*, Vol. 70, Iss. 11, pp. 2590-2595 (Nov 2012).

J.W. Weidner, S.G. Mashnik, K.D. John, F. Hemez, B. Ballard, H. Bach, E.R. Birnbaum, L. J. Bitteker, A. Couture, D. Dry, M.E. Fassbender, M.S. Gulley, K.R. Jackman, J.L. Ullmann, L.E. Wolfsberg, and F.M. Nortier, "Proton-induced Cross Sections Relevant to Production of ²²⁵Ac and ²²³Ra in Natural Thorium Targets Below 200 MeV." *Applied Radiation and Isotopes*, Vol. 70, Iss. 11, pp. 2602-2607 (Nov 2012).

J.W. Engle, S.G. Mashnik, J.W. Weidner, L.E. Wolfsberg, M.E. Fassbender, K. Jackman, A. Couture, L. J. Bitteker, J.L. Ullmann, M.S. Gulley, C. Pillae, K.D. John, E.R. Birnbaum, and F.M. Nortier, "Cross Sections from Proton Irradiation of Thorium at 800 MeV." *Physical Review C*, Vol. 88, Article No. 014604 (Jul 2013).

WOLF, PAUL J.,

Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1994 (AFIT/ENP), and Associate Dean for Academic Affairs, Graduate School of Engineering and Management (AFIT/EN); BS, Regis College, 1978; MS, Air Force Institute of Technology, 1979; PhD, Air Force Institute of Technology, 1985. Dr. Wolf's research interests include experimental atomic/molecular spectroscopy, reactive and non-reactive collision kinetics, laser-based thin film deposition processes, ionospheric and atmospheric chemistry, environmental monitoring, and non-linear dynamics with a focus on complex systems. He has published over 20 papers. Tel. 937-255- 0452 (DSN 785-0452), email: Paul.Wolf@afit.edu

YEO, YUNG KEE,

Professor of Physics, Department of Engineering Physics, AFIT Appointment Date: 1984 (AFIT/ENP); BS, Seoul National University, 1961; PhD, University of Southern California, 1972. Professor Yeo's research interests are in the area of solid state physics, especially characterization of the electrical, magnetic, and optical properties of elemental, compound, ternary, and quaternary semiconductors using techniques, such as Hall-effect measurement; deep level transient spectroscopy; superconducting quantum interference device; magnetic circular dichroism; cathodoluminescence; electroluminescence; and photoluminescence. Professor Yeo has published more than 117 articles in archival journals and several technical reports, presented more than 213 papers at professional conferences, and holds one patent. He is a reviewer for the Applied Physics Letters, Journal of Applied Physics, Journal of Electronic Materials, and Air Force Office of Scientific Research (AFOSR) proposal. He is currently funded by the AFOSR to study narrow band gap semiconductors such as GeSn and SiGeSn. This work involves collaborative effort with the University of Arizona, University of Delaware, Kangwon National University, and Taiwan National University. He has

directed the research of 9 post-doctoral fellows, 17 PhD students, and 25 MS students. He received the Ezra Kotcher Award for 1990, received the Gage H. Crocker Outstanding Professor Award for 1992, and received the General Bernard A. Schriever Award for 1997. Tel. 937-255-3636 x4532 (DSN 785-3636 x4532), email: Yung.Yeo@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Electrical and Optical Activation Studies of Ion Implanted ZnO Bulk, Epitaxial Layers, and Nano Wires.”

Sponsor: AFOSR. Funding: \$75,000.

“Optical and Electrical Characterization of Direct Bandgap GeSn and GeSiSn Semiconductors and Devices.”

Sponsor: AFOSR. Funding: \$91,001.

REFEREED JOURNAL PUBLICATIONS

Mee-Yi Ryu, Y. K. Yeo, Mohamed Ahoujja, Richard Beeler, and John Kouvetakis. “Degenerate parallel conducting layer and conductivity type conversion observed from $p\text{-Ge}_{1-y}\text{Sn}_y$ ($y = 0.06\%$) grown on $n\text{-Si}$ substrate,” *Applied Physics Letters*, Vol. 101, Article No. 131110/1-5 (2012).

Mee-Yi Ryu, Tom R. Harris, Y. K. Yeo, R. T. Beeler, and J. Kouvetakis, “Temperature-dependent photoluminescence of Ge/Si and $\text{Ge}_{1-y}\text{Sn}_y/\text{Si}$, indicating possible indirect-to-direct bandgap transition at lower Sn content,” *Applied Physics Letters*, Vol. 102, Article No. 171908/1-4 (May 2013).

Jae Won Oh, Mee-Yi Ryu, Byounggu Jo, Jin Soo Kim, Tom R. Harris, and Yung Kee Yeo, “Optical characteristics of seven-stacked InAs/InAlGaAs quantum dots,” *Thin Solid Films*, Vol. 541, pp. 68-71 (Aug 2013).

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Invited talk, “Optical and electrical properties of $\text{Ge}_{1-y}\text{Sn}_y$ direct bandgap semiconductors grown on Si and Ge substrates,” presented at the 16th International Symposium on the Physics of Semiconductor and Applications (ISPSA-XI, 2013), 2-5 Jul 2013, Jeju, Korea.

Invited talk, “Ge- and Si-based direct bandgap semiconductors such as $\text{Ge}_{1-y}\text{Sn}_y$ and $\text{Ge}_{1-x-y}\text{Si}_x\text{Sn}_y$ alloys grown on Si and Ge substrates,” presented at the Dongguk University on 9 Jul 2013 in Seoul, Korea.

International Advisory Committee of the 16th International Symposium on the Physics of Semiconductors and Applications for 2012-2013.

ZENS, TIMOTHY W., Capt,

Assistant Professor of Materials Science, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS Physics and BS Mathematics, University of Minnesota, Minneapolis; MS, Air Force Institute of Technology, 2005; PhD, Massachusetts Institute of Technology, 2011; Academic Awards: American Legion Scholastic Award, 2000; Society of the War of 1812 Award (for Academic Excellence), 2001; American Veterans Award (Scholastic), 2003; American Association for Crystal Growth; Bonner Memorial scholarship, 2006 and 2007.—Dr Zens has expertise in synthesis of electronic and optical materials and devices. His research is focused on: synthesis of bulk ThO_2 and UO_2 crystals using hydrothermal growth techniques; fabrication of laser power converters using molecular beam epitaxy; orientation patterned infrared non-linear optical materials for infrared countermeasures and terahertz generation; growth of 2D BN on graphene; and long wavelength infrared detectors from polycrystalline $\text{Pb}_{1-x}\text{Sn}_x\text{Te}$ films. Tel. 937-255-3636 x 4695 (DSN 785-3636 x4695), email: Timothy.Zens@afit.edu

REFEREED JOURNAL PUBLICATIONS

Vivek Singh, Timothy Zens, Juejun Hu, Jianfei Wang, J. David Musgraves, Kathleen Richardson, Lionel C. Kimerling, and Anu Agarwal. “Evanescently-Coupled Mid-Infrared Photodetector for Integrated Sensing Applications: Theory and Design,” *Sensors & Actuators*, Vol. 185, pp. 195-200 (2013).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

T. D. Kelly, J. C. Petrosky, J. W. McClory, T. Zens, D. Turner, J. Matthew Mann, Joseph W. Kolis, Juan A. Colón Santana and Peter A. Dowben, 'The Debye Temperature for Hydrothermally Grown ThO₂ Single Crystals', *Materials Research Society Symposium Proceedings*, Vol. 1576-Nuclear Radiation Detection Materials (Aug 2013).

Jacob Castilow, Colin D. McMillen, James M. Mann, Joseph Kolis, James Petrosky, Timothy W Zens, David Turner, "Hydrothermal Synthesis and Characterization of ThO₂, U_xTh_{1-x}O₂, and UOx," *Proceedings of the 2013 Materials Research Society Spring Meeting*, Vol. 1576- Nuclear Radiation Detection Materials, Paper No. WW3.06 (Aug 2013).

5.4. DEPARTMENT OF MATHEMATICS AND STATISTICS

Access Phone: 937-255-3098, DSN 785-3098

Fax: 937-656-4413, DSN 986-4413

Homepage: <http://www.afil.edu/en/enc/>

5.4.1	<u>DOCTORAL DISSERTATIONS</u>	133
5.4.2	<u>MASTER'S THESES</u>	133
5.4.3	<u>FACULTY BIOGRAPHIES & RESEARCH OUTPUT</u>	134

5.4.1. DOCTORAL DISSERTATIONS

GUTMAN, ALEX J., *Construction, Analysis, and Data-Driven Augmentation of Supersaturated Designs*. AFIT/ENC/DS/13S-02. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

POTEET, MIRIAM J., *Parametrizing Finite Frames and Optimal Frame Completions*. AFIT/ENC/DAM/12-02. Faculty Advisor: Dr. Matthew C. Fickus. Sponsor: NSF.

SCHROCK, CHRISTOPHER R., *Distributional Monte Carlo Methods for the Boltzmann Equation*. AFIT/ENC/DS/13M-06. Faculty Advisor: Dr. Aihua W. Wood. Sponsor: AFRL/RQ & AFOSR.

5.4.2. MASTER'S THESES

COOKE, DAVID J., *A Discrete X-Ray Transform for Chromotomographic Hyperspectral Imaging*. AFIT/ENC/13M-05. Faculty Advisor: Dr. Matthew C. Fickus. Sponsor: NSF.

FERRY, GREGORY J., *Cost Growth above Inflation (CGAI) in Operating and Support (O&S) Costs in Raw Materials for Air Force Aircraft*. AFIT/ENC/13M-02. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

FREEMAN, CHARLTON E., *Multivariate and Naïve Bayes Text Classification Approach to Cost Growth Risk in Department of Defense Acquisition Programs*. AFIT/ENC/13M-03. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

JONES, GARY L., *Investigation into the Ratio of System Operations and Support Costs to Life-Cycle Costs for Department of Defense Weapon Systems*. AFIT/ENC/13M-01. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

PEROT, JUAN E., *Foreign Military Sales: A Historical Review of Argentina's Purchases*. AFIT/ENC/13M-04. Faculty Advisor: Dr. Edward D. White. Sponsor: N/A.

SHIVELEY, THEODORE C., *Determining Optimal Machine Replacement Events with Periodic Inspection Intervals*. AFIT/ENC/13M-17. Faculty Advisor: Maj James D. Cordeiro. Sponsor: AMC/A9.

5.4.3. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

AKERS, BENJAMIN F.,

Assistant Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2011 (AFIT/ENC); BS Pennsylvania State University, 2003; MA, University of Wisconsin - Madison, 2005; PhD, University of Wisconsin - Madison, 2008. Dr. Akers' research interests include nonlinear waves, applied mathematics, fluid mechanics, and numerical analysis. Dr. Akers current research considers the stability and existence of traveling water waves, especially developing numerical methods for problems with two-dimensional kernels. Tel. 937-255-3636 x4522 (DSN 785-3636 x4522), email: Benjamin.Akers@afit.edu

REFEREED JOURNAL PUBLICATIONS

Akers, B. and D. P. Nicholls, Spectral stability of deep two-dimensional gravity-capillary water waves, *Studies in Applied Mathematics* **130** (2013), 81-107.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Akers, B., "Overturned Traveling Waves," Banff International Research Station workshop on "Water Waves: Computational approaches for complex problems," Banff, Alberta, Canada, Jul, 2013.

Organized the "Waves and their applications in climate science" session at the Eighth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, Mar 2013

Member of Scientific Program Committee for the Eighth IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, Athens, GA, Mar 2013.

BAKER, WILLIAM P.,

Associate Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 1986 (AFIT/ENC); BA, University of California at Irvine, 1969; MA, University of California at Irvine, 1970; PhD, Northwestern University, 1987. Dr. Baker's research interests include asymptotic and perturbation methods, wave propagation and scattering theory, applied mathematics, functional analysis, low observables, and numerical analysis. Dr. Baker's current research is in thermal dynamics of high speed wear, vibrational dynamics of thermally loaded materials and dynamics and control of satellite structures. Dr. Baker is a Master Navigator with prior military assignments in flight test, satellite communications, cruise missile and radar analysis. Tel. 937-255-3636 x4517 (DSN 785-3636 x4517), email: William.Baker@afit.edu

BULUTOGLU, DURSUN A.,

Associate Professor of Statistics, Department of Mathematics and Statistics, AFIT Appointment Date: 2004, (AFIT/ENC); BS, University of Maryland at College Park, 1996; PhD, University of California, Berkeley, 2001. Dr. Bulutoglu's research interests include design of experiments and combinatorial problems in statistics. His papers are on finding GMA (generalized minimum aberration) factorial designs by enumerating all non-isomorphic orthogonal arrays. The tools he uses for enumerating orthogonal arrays are integer programming, constraint programming and isomorphism rejection. Tel. 937-255-3636 x4704 (DSN 785-3636 x4704), email: Dursun.Bulutoglu@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Constraint Programming, Heuristic Algorithms and Computer Generated GWP Lower Bounds for Finding Efficient Designs and Test Suites for Test and Evaluation." Sponsor: AFOSR. Funding: \$34,082.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewer for *Annals of Statistics*, *Journal of the American Statistical Association*, and *Journal of Statistical Planning and Inference*.

Bulutoglu, D. A., "Finding the Symmetry Group of a Linear Program," AFOSR Program Meeting, Arlington VA., Apr, 2013.

Bulutoglu, D. A., "Finding GMA Designs by Enumeration," Spring Research Conference on Statistics in Industry and Technology, University of California, Los Angeles, Los Angeles, CA, Jun, 2013.

CHAPIN, PATRICK S., Maj,

Assistant Professor of Statistics, Department of Mathematics and Statistics, AFIT Appointment Date: 2009, (AFIT/ENC); BS, United States Air Force Academy, 2002; MS, Air Force Institute of Technology, 2004; PhD, Iowa State University, 2009. Maj Chapin's research interests include computer experiments, validation of computer models, design of experiments, MCMC simulation and Bayesian Statistics. He has served as an Air Force analytical scientist for 3 years including manpower/force structure analysis and BRAC cost analysis.

CORDEIRO, JAMES D., Maj,

Assistant Professor of Statistics, Department of Mathematics and Statistics, AFIT Appointment Date: 2010, (AFIT/ENC); BA, University of California, Berkeley, 1989; MS, University of Washington, 1992; MS, Air Force Institute of Technology, 1998; PhD, Air Force Institute of Technology, 2007. Maj Cordeiro's primary research interests include stochastic modeling and Markov decision processes. He has served as an Air Force analyst for most of his career, specializing in such areas as operational test and evaluation and manpower and personnel at Headquarters, U.S. Air Force. He has also held the rank of Assistant Professor at the U.S. Air Force Academy. Tel. 937-255-3636 x4398, email: James.Cordeiro@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewer for *IIE Transactions*, *Journal of Statistical Theory and Practice*, *Operations Research*, *Opsearch*, and *Simulation Modeling Practice and Theory*.

DEA, JOHN R., Lt Col,

Assistant Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2008 (AFIT/ENC); BS, Baylor University, 1993; MS, Creighton University, 1998; PhD, Naval Postgraduate School, 2008. Lt Col Dea's research interests include numerical analysis of fluid flow and wave propagation, including recent papers on non-reflecting boundary conditions for modeling wave propagation in a truncated portion of a large or infinite domain. Lt Col Dea's previous military assignments include software development for strategic war-planning systems, flight test support and coordination, and architecture and systems engineering for long-term space superiority mission area planning. Tel. 937-255-3636 x4584, email: John.Dea@afit.edu

REFEREED JOURNAL PUBLICATIONS

Dea, J. R., Absorbing boundary conditions for the fractional wave equation, *Applied Mathematics and Computation* **219** (2013), 9810-9820.

ERICH, ROGER A., Capt,

Assistant Professor of Statistics, Department of Mathematics and Statistics, AFIT Appointment Date: 2011, (AFIT/ENC); BS, The Pennsylvania State University, 2003; MS, Air Force Institute of Technology, 2005; MS, The Ohio State University, 2009; PhD, The Ohio State University, 2012. Capt Erich's research interests include biostatistics, survival analysis, and threshold regression. He has served as an Air Force analytical scientist for 3 years conducting wargaming operations-analysis.

FICKUS, MATTHEW C.,

Associate Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2004, (AFIT/ENC); BS, University of Maryland, Baltimore County, 1995; MS, University of Maryland, Baltimore County, 1997; PhD, University of Maryland, College Park, 2001. Dr. Fickus' research interests include pure and applied harmonic analysis, Fourier series, wavelets and frames. Tel. 937-255-3636 x4513 (DSN 785-3636 x4513), email: Matthew.Fickus@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“ATD: Frame-Theoretic Information Fusion for Threat Detection.” Sponsor: NSF. Funding: \$64,441.

“Theory of Multi-Resolution Classification with Bases and Frames.” Sponsor: NSF. Funding: \$18,827.

REFEREED JOURNAL PUBLICATIONS

Cahill, J., M. Fickus, D. G. Mixon, M. J. Poteet, N. Strawn, Constructing finite frames of a given spectrum and set of lengths, *Applied and Computational Harmonic Analysis* **35** (2013), 52–73.

Massar, M. L., R. Bhagavatula, M. Fickus, J. Kovacevic, Local histograms and image occlusion models, *Applied and Computational Harmonic Analysis* **34** (2013), 469–487.

Mixon, D. G., C. J. Quinn, N. Kiyavash, and M. Fickus, Fingerprinting with equiangular tight frames, *IEEE Transactions on Information Theory* **59** (2013), 1855-1865.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

McCann, M. T., R. Bhagavatula, M. Fickus, J. A. Ozolek, and J. Kovacevic, Automated colitis detection from endoscopic biopsies as a tissue screening tool in diagnostic pathology, *Proceedings of the IEEE International Conference on Image Processing*, 2809-2812, Orlando, FL, Oct, 2012.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewer for *National Science Foundation, Abstract and Applied Analysis, Advances in Computational Mathematics, Applied and Computational Harmonic Analysis, IEEE Signal Processing Letters, IEEE Transactions on Geoscience and Remote Sensing, International Conference on Sampling Theory and Applications, Journal of Fourier Analysis and Applications, Linear Algebra and its Applications, and Signal Processing.*

Fickus, M., “Group-theoretic constructions of erasure-robust frames,” Erwin Schrodinger Institute workshop on “Phase Retrieval,” Vienna, Austria, Oct, 2012.

Fickus, M., “Towards deterministic compressed sensing,” NSF/DTRA/NGA 2012 Algorithm Workshop, San Diego, CA, Nov, 2012.

Fickus, M., “Frames and Erasures,” Carnegie Mellon University Workshop on “Filterbanks, frames and bioimaging,” Pittsburgh, PA, Dec, 2012.

Fickus, M., “Group-theoretic constructions of erasure-robust frames,” Norbert Wiener Center February Fourier Talks, College Park, MD, Feb, 2013.

Fickus, M., “Group-theoretic constructions of erasure-robust frames,” 14th International Conference in Approximation Theory, San Antonio, TX, Apr, 2013.

Fickus, M., “Characterizing completions of finite frames,” AMS Spring Western Sectional Meeting, Boulder, CO, Apr, 2013.

Casazza, P. G. and M. Fickus, Organized special session at SPIE Optics and Photonics, San Diego, CA, Aug, 2013.

Bodmann, B. G, P. G. Casazza, and M. Fickus, Organized special session at the 2013 International Conference on Sampling Theory and Applications, Bremen, Germany, Jul, 2013.

Fickus, M., "Compressed sensing with equiangular tight frames," Coastal Carolina University's Department of Mathematics & Statistics Colloquium, Conway, SC, Sep, 2013.

Fickus, M., "Compressed sensing with equiangular tight frames," Vanderbilt University's Computational Analysis Seminar, Nashville, TN, Sep, 2013.

Fickus, M., "Compressed sensing with equiangular tight frames," Michigan State University's Applied Mathematics Seminar, East Lansing, MI, Sep, 2013.

Fickus, M., "Open problems on equiangular tight frames," American Institute of Mathematics workshop on "Frame theory intersects geometry," Palo Alto, CA, Jul, 2013.

Fickus, M., "Characterizing completions of finite frames," 10th International Conference on Sampling Theory and Applications, Bremen, Germany, Jul, 2013.

LAIR, ALAN V.,

Professor of Mathematics and Head, Department of Mathematics and Statistics, AFIT Appointment Date: 1982, (AFIT/ENC); BA, North Texas State University, 1970; MS, Texas Tech University, 1972; PhD, Texas Tech University, 1976. Dr. Lair's research interests include parabolic and elliptic partial differential equations, functional analysis, applied mathematics, and nonlinear diffusion. He has published several papers on the properties of solutions of various nonlinear partial differential equations. Tel. 937-255-3636 x4519 (DSN 785-3636 x4519), email: Alan.Lair@afit.edu

REFEREED JOURNAL PUBLICATIONS

Lair, A. V. and A. Mohammed, Entire large solutions to elliptic equations of power non-linearities with variable exponents, *Advanced Nonlinear Studies* **13** (2013), 699-719.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Editorial Board, *ISRN Mathematical Analysis*.

Reviewer for *Mathematical Reviews*.

MCBEE, BRIAN K., Lt Col,

Assistant Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2011. (AFIT/ENC); BS, Brigham Young University, 1992; MS, University of Colorado, Colorado Springs, 1998; MS, The Ohio State University, 2004; MS, Virginia Polytechnic and State University, 2011; PhD, Virginia Polytechnic and State University, 2011. Lt Col McBee's primary research interests include numerical partial differential equations and control as applied to fluid dynamics, numerical methods with emphasis on finite elements, geodetic science, and applications of mathematics in intelligence gathering. He has served as an intelligence officer providing RC-135 support and reporting, near-real-time space and missile events analysis, foreign counter-space capabilities assessments, battlestaff-level modeling and simulation exercise support, and national-agency-level training and education oversight for Title X training as well as Advanced Geospatial Intelligence (AGI) and synthetic aperture radar (SAR) exploitation. Tel. 937-255-3636 x4635 (DSN 785-3636x4635), email: Brian.McBee@afit.edu

MIXON, DUSTIN G., Capt,

Assistant Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2012, (AFIT/ENC); BS, Central Washington University, 2004; MS, Air Force Institute of Technology, 2006;

MA, Princeton University, 2010; PhD, Princeton University, 2012. Capt Mixon's research interests include applied harmonic analysis, frame theory, compressed sensing and signal processing. He has served as an Air Force analytical scientist for 3 years modeling biological responses to radiofrequency radiation. Tel. 937-255-3636 x4516 (DSN 785-3636 x4516), email: Dustin.Mixon@afit.edu

REFEREED JOURNAL PUBLICATIONS

Cahill, J., M. Fickus, D. G. Mixon, M. J. Poteet, N. Strawn, Constructing finite frame of a given spectrum and set of lengths, *Applied and Computational Harmonic Analysis* **35** (2013), 52–73.

Bandeira, A. S., E. Dobriban, D. G. Mixon, W. F. Sawin, Certifying the restricted isometry property is hard, *IEEE Transactions on Information Theory* **59** (2013), 3448-3450.

Mixon, D. G., C. J. Quinn, N. Kiyavash, M. Fickus, Fingerprinting with equiangular tight frames *IEEE Transactions on Information Theory* **59** (2013), 1855-1865.

Alexeev, B., J. Cahill, D. G. Mixon, Full spark frames, *Journal of Fourier Analysis and Applications* **18** (2012), 1167-1194.

Mixon, D. G., Another simple proof of the infinitude of primes, *American Mathematical Monthly* **119** (2012), 812.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Bajwa, W. U. and D. G. Mixon, “Group Model Selection Using Marginal Correlations: The Good, the Bad and the Ugly,” *Proceedings of the 50th Annual Allerton Conference on Communication, Control, and Computing*, 494-501, Monticello, IL, Oct, 2012.

Bandeira, A. S., J. Cahill, D. G. Mixon, and A. A. Nelson, “Fundamental limits of phase retrieval,” *Proceedings of the 2013 International Conference on Sampling Theory and Applications*, Bremen, Germany, Jul, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Bandeira, A. S. and D. G. Mixon, “Near-optimal phase retrieval of sparse vectors,” *Proceedings of SPIE*, San Diego, CA, Aug, 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewer for *Acta Applicandae Mathematicae*, *Advances in Computational Mathematics*, *Computational Statistics*, *IEEE Global Conference on Signal and Information Processing*, *IEEE Signal Processing Letters*, *IEEE Transactions on Information Theory*, *International Conference on Sampling Theory and Applications*, and *Mathematical Reviews*.

Mixon, D. G., “Phase retrieval: Approaching the theoretical limits in practice,” Program in Applied and Computational Mathematics (PACM) IDeAS Seminar, Princeton University, Princeton, NJ, Dec, 2012.

Mixon, D. G., “Phase retrieval: Approaching the theoretical limits in practice,” Norbert Wiener Center February Fourier Talks, workshop on “Phaseless Reconstruction,” College Park, MD, Feb, 2013.

Mixon, D. G., “Phase retrieval with polarization,” Erwin Schrodinger Institute workshop on “Phase Retrieval,” Vienna, Austria, Oct, 2012.

Mixon, D. G., “Fundamental limits of phase retrieval,” 2013 International Conference on Sampling Theory and Applications, Bremen, Germany, Jul, 2013.

Mixon, D. G., "Injectivity conditions for phase retrieval," American Institute of Mathematics workshop on "Frame theory intersects geometry," Palo Alto, CA, Jul, 2013.

OXLEY, MARK E.,

Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 1987 (AFIT/ENC), and Researcher, Sensor Fusion Laboratory, Center for Operational Analysis (COA); BS, Cumberland College, 1978 (Renamed to University of the Cumberland's in 2005); MS, Purdue University, 1980; PhD, North Carolina State University, 1987. Dr. Oxley's research interests include partial differential equations, free and moving boundary value problems, finite-time extinction problems, functional analysis, optimization, artificial neural networks, groundwater modeling, wavelet analysis, classifier fusion, sensor fusion and evaluation of fusion techniques, receiver operating characteristic (ROC) curves and manifolds. Dr. Oxley's recent research is funded by AFOSR, AFRL/RB, AFRL/RV, and DARPA to work on information fusion of ATR systems. Several of his students have written theses and dissertations on optimal remediation of pump-and-treat systems, binaural listening, measuring the capability of artificial neural networks and most recently the fusion of multiple classification systems, the theory of data fusion using category theory, the performance of the fusion of systems, and ROC analysis specifically, ROC curves and ROC manifolds. Tel. 937-255-3636 x4515 (DSN 785-3636 x4515), email: Mark.Oxley@afit.edu

REFEREED JOURNAL PUBLICATIONS

Reynolds, M. B., D. R. Hulce, K. M. Hopkinson, M. E. Oxley, and B. E. Mullins, A bin packing heuristic for on-line service placement and performance control, *IEEE Transactions on Network and Service Management* **10** (2013), 326-339.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Baker, N. A., J. L. Barry, G. T. Bonheyo, C. A. Joslyn, K. Krishnaswami, M. E. Oxley, R. Quadrel, L. H. Sego, M. F. Tardiff, and A. S. Wynne, "Research Towards a Systematic Signature Discovery Process," IEEE Intelligence and Security Informatics 2013, Workshop on Signature Discovery for Intelligence and Security, Paper 5, Seattle WA, Jun, 2013.

Venzin, A. M., M. E. Oxley, N. Beagley, "An Investigation into Label Fusion on Sparse Data," IEEE Intelligence and Security Informatics 2013, Workshop on Signature Discovery for Intelligence and Security, Paper 6, Seattle WA, Jun, 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Oxley, M. E. and A. Venzin, "Receiver Operating Characteristic Analysis for Detecting Explosives-related Threats," DOE Technical Report No. AFIT/EN 11-2012-1, OSTI ID: 1068871, USDOE DHS, 14 Nov 2012.

Paper Review Manager for *Information Fusion*.

Reviewer for *Advances in Information Fusion*, *Information Fusion*, *Natural Resource Modeling*, *Journal of Engineering and Technology Research*, *1st IFAC Workshop on Control of Systems Modeled by Partial Differential Equations (CPDE 2013)*, *International Conference on Information Fusion*, *21st European Signal processing Conference (EUSIPCO 2013)*, *IEEE International Multi-Disciplinary Conference on Cognitive Methods in Situation Awareness and Decision Support (CogSIMA)*.

PETERSON, JESSE D., Capt,

Assistant Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2013, (AFIT/ENC); BS, South Dakota State University, 2006; MS, Air Force Institute of Technology, 2008; PhD, University of Missouri – Columbia, 2013. Capt Peterson's research interests include applied harmonic analysis and frame theory. He has served as an Air Force analytical scientist operationally testing and evaluating A-10C, F-16, F-15C, F-15E, and F-22 aircraft. Tel. 937-255-3636 x4619 (DSN 785-3636 x4619), email: Jesse.Peterson@afit.edu

POND, KEVIN R., Capt,

Assistant Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2010. (AFIT/ENC); BS, Mathematical Science, The University of Texas at Dallas, 2003; MS, Mathematical Science, The University of Texas at Dallas, 2005; PhD, Mathematics, Virginia Polytechnic and State University, 2010. Capt Pond's primary research interests include numerical methods, finite element methods, and uncertainty quantification. He has served as an Air Force analytical scientist operationally testing and evaluating the CV-22 and MQ-9 platforms. Tel. 937-255-3636 x4630 (DSN 785-3636 x4630), email: Kevin.Pond@afit.edu

QUINN, DENNIS W.,

Professor Emeritus of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 1974, (AFIT/ENC); BA, Mathematics, University of Delaware, 1969; MS, Applied Mathematics, University of Delaware, 1971; PhD, Applied Mathematics, University of Delaware, 1973. Dr. Quinn's fields of expertise include numerical methods, finite elements, finite differences, integral equation methods, numerical analysis, functional analysis, system identification, and applied mathematics. Dr. Quinn has advised several MS students in modeling toxic chemical exposure. Dr. Quinn has published papers dealing with integral and finite element solutions of acoustic problems, using the telegrapher's equation to model lightning, using the method of characteristics in cancer risk assessment, using the diffusion equation to model diffusion through the skin in pharmacokinetic modeling, and using the boundary element method for moving boundary problems.

REEGER, JONAH A., Capt,

Assistant Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 2013. (AFIT/ENC); BS, Mathematical Sciences, United States Air Force Academy, 2007; MA, Computational and Applied Mathematics, Rice University, 2009; PhD, Applied Mathematics, The University of Colorado Boulder, 2013. Capt Reeger's primary research interests include Taylor series and Padé approximation methods, multi-step methods, optimization and optimal control, radial basis functions, pseudospectral methods, and the Painlevé equations. He has served as an Air Force analytical scientist on the acquisition of an experimental infrared satellite. Tel. 937-255-3636 x3320 (DSN 785-3636 x3320), email: Jonah.Reeger@afit.edu

REYNOLDS, DANIEL E.,

Assistant Professor Emeritus of Statistics, Department of Mathematics and Statistics, AFIT Appointment Date: 1974, (AFIT/ENC); AB, University of Rochester, 1965; MS, Air Force Institute of Technology, 1971; MS, Wright State University, 1983. Professor Reynolds' research interests include management cybernetics, learning theory, and exploring ways computer graphics can support statistical and mathematical education. In 1989, Professor Reynolds received Tau Beta Phi's Outstanding Professor Award.

SCHUBERT KABBAN, CHRISTINE M.,

Assistant Professor of Statistics, Department of Mathematics and Statistics, AFIT Appointment Date: 2010 (AFIT/ENC); BA, University of Dayton, 1992; MBA, Wright State University, 1994; MS, Wright State University, 1995; PhD, Air Force Institute of Technology, 2005. Dr. Schubert's research interests include classification techniques, ROC curve theory and extensions, information fusion, longitudinal modeling, regression and regression extensions, survey design and analysis, and general biostatistics. Dr. Schubert's current research is in evaluating the performance of classification systems and information-fused systems via ROC methodology, sequential strategies for classification, as well as epidemiological applications to disease prediction and medical diagnostics. Tel. 937-255-3636 x4549 (DSN 785-3636 x4549), email: Christine.Schubertkabban@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Performance Evaluation and Validation in Structural Health Monitoring Systems." Sponsor: AFOSR. Funding: \$143,429.

"Sequencing Classification Systems for Improved Accuracy and Reduced Cost." Sponsor: AFOSR. Funding: \$25,776.

REFEREED JOURNAL PUBLICATIONS

- Tuck, I., B. Baliko, C. M. Schubert, and L. Anderson, A pilot study of a weekend retreat intervention for family survivors of homicide, *Western Journal of Nursing Research* **34** (2012), 766-794. PMID: 22566289.
- Starkweather, A.R., D. E. Lyon, and C. M. Schubert, Pain and inflammation in women with early-stage breast cancer prior to induction of chemotherapy, *Biological Research for Nursing* **15** (2013), 234-241. PMID: 22084403.
- Ryan, E.T., D. R. Jacques, J. D. Ritschel, and C. M. Schubert, Characterizing the accuracy of DOD operating and support cost estimates, *The Journal of Public Procurement* **13** (2013), 103-132.
- Ryan, E.T., C. M. Schubert Kabban, D. R. Jacques, and J. D. Ritschel, A macro-stochastic model for improving the accuracy of Department of Defense life cycle cost estimates, *Journal of Cost Analysis and Parametrics* **6** (2013), 43-74.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

- Schubert Kabban, C. M., A. S. King and M. M. Derriso, "A Notional Framework and Model to Improve Monitoring of Structural Health Systems," *Proceedings of the 9th International Workshop on Structural Health Monitoring (IWSHM)*, 10 pages, Palo Alto, CA, Sep 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

- Member, Research Committee, Center for Human Animal Interaction, Virginia Commonwealth University.
- Reviewer for *Journal of Pediatrics* and *Structural Health Monitoring*.
- Panelist for "Pathways to Academic Leadership" as part of the workshop: Keys to Academic Success: Diversity and Leadership, hosted by the LEADER Consortium, Dayton, OH, Apr, 2013.
- Schubert Kabban, C. M., "Computing POD for Structural Health Monitoring Systems," U.S. Army Conference on Applied Statistics, Monterey, CA, Oct, 2012.
- Schubert Kabban, C. M., "Extending ROC Curves for Multiple Responses: Manifolds and Optimal Points," Virginia Commonwealth University Department of Biostatistics Colloquium, Richmond, VA, Mar, 2013.
- Schubert Kabban, C. M., "Extending ROC Curves for Multiple Responses: Manifolds and Optimal Points," Air Force Research Laboratory AFRL/RXCA Colloquium, Wright Patterson AFB, OH, Mar, 2013.
- Schubert Kabban, C. M., Invited Speaker in the Chaminade Julianne High School STEMM Idol Speaker Series, Dayton, OH, Nov, 2013.

WARR, RICHARD L., Lt Col,

Assistant Professor of Statistics and Deputy Department Head, Department of Mathematics and Statistics, AFIT Appointment Date: 2010 (AFIT/ENC); BS, Southern Utah University, 1996; MA, University of Nebraska at Omaha, 2005; MS, University of New Mexico, 2009; PhD, University of New Mexico, 2010. Lt Col Warr's research interests include reliability, semi-Markov processes, Bayesian statistics and model fit assessment. Tel. 937-255-3636 x4669 (DSN 785-3636 x4669), email: Richard.Warr@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

- "A Bayesian Nonparametric Approach for Combining Heterogeneous Reliability Data." Sponsor: LANL. Funding: \$30,000.

REFEREED JOURNAL PUBLICATIONS

Collins, D. H., J. K. Freels, A. V. Huzurbazar, R. L. Warr, and B. P. Weaver, Accelerated test methods for reliability prediction, *Journal of Quality Technology* **45** (2013), 244-259.

Collins, D. H., R. L. Warr, and A. V. Huzurbazar, An introduction to statistical flowgraph models for engineering systems, *Journal of Risk and Reliability* **227** (2013), 461-470.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Warr, R. L. and D. H. Collins, "Bayesian nonparametric models for combining heterogeneous reliability data," *JSM Proceedings*, Physical and Engineering Sciences section, Alexandria, VA: American Statistical Association (2012), 2220-2232.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewer for *The American Statistician*, *Journal of Risk and Reliability*, and *International Work-Conference on Bioinformatics and Biomedical Engineering*.

Warr, R. L., "Accelerated Test Methods for Reliability Prediction," Army Conference on Applied Statistics, Monterey CA, Oct, 2012.

WHITE, EDWARD D., III,

Associate Professor of Statistics, Department of Mathematics and Statistics, AFIT Appointment Date: 1998 (AFIT/ENC); BS, University of Tampa, 1990; MAS, Ohio State University, 1991; PhD, Texas A&M University, 1998. Dr. White's research interests include design of experiments, categorical data analysis, biostatistics, and model building. Tel. 937-255-3636 x4540 (DSN 785-3636 x4540), email: Edward.White@afit.edu

REFEREED JOURNAL PUBLICATIONS

Sitzbee, W. E., E. D. White, and A. W. Dowling, Degradation modeling of polyurea pavement markings, *Public Works Management & Policy* **18** (2013), 185-199.

Lee, S. M., A. E. Thal, Jr., E. J. Unger, and E. D. White III, Daylighting strategies: Life-cycle cost modeling and policy implications for emerging technology, *Engineering Management Journal* **24** (2012), 3-17.

Worden, T. and E. D. White, Modifying the U.S. Air Force fitness test to reflect physical combat fitness: One study's perspective, *Military Medicine* **177** (2012), 1090-1094.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER

Ramsey, B. W., B. E. Mullins, and E. D. White, "Improved Tools for Indoor ZigBee Warwalking," *Proceedings of the 7th IEEE International Workshop on Practical Issues in Building Sensor Network Applications*, 925-928, Clearwater, FL, Oct, 2012.

Gutman, A. J., E. D. White, and R. R. Hill, "Large Screening Experiments: An Overview of Supersaturated Designs for Practitioners," *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, 3328-3337, San Juan, Puerto Rico, May, 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Co-Editor of the *Journal of Cost Analysis and Parametrics*.

Reviewer for *Military Operations Research*, *Journal of Cost Analysis and Parametrics*, and *Journal of Applied Statistics*.

Gutman, A. J., E.D. White, and R.R. Hill, “Large Screening Experiments: An Overview of Supersaturated Designs for Practitioners,” Industrial and Systems Engineering Research Conference, 63rd IIE Annual Conference and Expo, San Juan, Puerto Rico, May, 2013.

Ramsey, B. W., B. E. Mullins, and E. D. White, “Improved Tools for Indoor ZigBee Warwalking,” 7th IEEE International Workshop on Practical Issues in Building Sensor Network Applications, Clearwater, FL, Oct, 2012.

WOOD, AIHUA W.,

Professor of Mathematics, Department of Mathematics and Statistics, AFIT Appointment Date: 1994 (AFIT/ENC); BS, Beijing University, 1984; MS, University of Connecticut, 1988; PhD, University of Connecticut, 1990. Dr. Wood's research interests include partial differential equations, electromagnetic wave propagation, and Boltzmann equations. Tel. 937-255-3636 x4272 (DSN 785-3636 x4272), email: Aihua.Wood@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Real-Time Combat Navigation System and Virtual Battlespace.” Sponsor: AFOSR. Funding: \$15,220.

“Distributional Direct Simulation Monte Carlo Methods.” Sponsor: AFOSR. Funding: \$30,666.

REFEREED JOURNAL PUBLICATIONS

Li, P. and A. Wood, A two-dimensional Helmholtz equation solution for the multiple cavity scattering problem, *Journal of Computational Physics* **240** (2013), 100-120.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewer for *Journal of Computational Physics*, *Journal of Applied and Computational Electromagnetics Society*, and *Journal of Thermophysics and Heat Transfer*.

Wood, A. W., “Topics on EM scattering from cavities, a survey,” Mathematics Colloquium, Xiamen University, Xiamen, China, Dec, 2012.

Wood, A. W., “A Distributional Monte Carlo Method for the Boltzmann Equation,” Topical Workshop on Issues in Solving the Boltzmann Equation for Aerospace Applications, ICERM, Brown University, Providence, RI, Jun, 2013.

Wood, A. W., “Topics on EM scattering from cavities, a survey,” 2nd International Conference on Interdisciplinary Computational and Applied Mathematics, Hangzhou, China, Jun, 2013.

5.5. DEPARTMENT OF OPERATIONAL SCIENCES

Access Phone: 937-255-2549, DSN 785-2549

Fax: 937-656-4943 DSN 986-4943

Homepage: <http://www.afit.edu/en/ens/>

5.5.1	<u>DOCTORAL DISSERTATIONS</u>	145
5.5.2	<u>MASTER'S THESES</u>	145
5.5.3	<u>GRADUATE RESEARCH PAPERS</u>	146
5.5.4	<u>FACULTY BIOGRAPHIES & RESEARCH OUTPUT</u>	148

5.5.1. DOCTORAL DISSERTATIONS

HARTMAN, PAUL L., *The Outsourcing-to-Insourcing Relocation Shift: A Response of U.S. Manufacturers to the Outsourcing Paradigm*. AFIT/ENS/DS/13J-18. Faculty Advisor: Dr. Jeffrey A. Ogden. Sponsor: SAF. [COA]

5.5.2. MASTER'S THESES

BIGLEY, ANDREW L., *Horn's Curve Estimation Through Multi-Dimensional Interpolation*. AFIT/ENS/13M-01. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/Ry. [COA]

BOLT, KARL E., *Supplier Quality Assessment Requirements (SQAR) and TAG Submission Analysis: Improving the Initial Submission Process at the F-22 Depot*. AFIT/ENS/13M-02. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AFMC/309 AMXG. [COA]

CLAPP, BENJAMIN A., *Vehicle Minimization for the Multimodal Pickup and Delivery Problem with Time Windows*. AFIT/ENS/13M-03. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

FINKBEINER, SCOTT C., *Urgent Aeromedical Evacuation Network Capacity Planning*. AFIT/ENS/13M-04. Faculty Advisor: Dr. Jeffery K. Cochran. Sponsor: AMC. [COA]

HAFICH, MICAH J., *A Mixed Integer Programming Model for Improving Theater Distribution Force Flow Analysis*. AFIT/ENS/13M-05. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

HILLMAN, ALEXANDER P., *Aerial Refueling Simulator Validation Using Operational Experimentation and Response Surface Methods with Time Series Responses*. AFIT/ENS/13M-06. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD. [COA]

HUBER, TROY T., *Identifying, Tracking, and Prioritizing Parts Unavailability*. AFIT/ENS/13M-07. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AFMC/A4. [COA]

KIEFFER, MITCHELL R., *Traumatic Brain Injury Recovery Care: Demand Forecasting, Staffing, and Treatment Planning*. AFIT/ENS/13M-08. Faculty Advisor: Dr. Jeffery K. Cochran. Sponsor: AFW2. [COA]

LEONARD, TAYLOR J., *Operational Planning of Channel Airlift Missions Using Forecasted Demand*. AFIT/ENS/13M-09. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

LESSIN, AARON M., *Estimating the Probability of Being the Best System: A Generalized Method and Nonparametric Hypothesis Test*. AFIT/ENS/13M-10. Faculty Advisor: Dr. John O. Miller. Sponsor: AFMC/AFSC. [COA]

MEENTS, JOSHUA B., *Control Variates and Optimal Designs in Metamodeling*. AFIT/ENS/13M-11. Faculty Advisor: Dr. Mark A. Friend. Sponsor: ACC/53 TMG. [COA]

MILLER, ERIC A., *A Network Analysis of Social Balance in Conflict in the Maghreb*. AFIT/ENS/13M-12. Faculty Advisor: Dr. Richard F. Deckro. Sponsor: USSOCOM.

MORRILL, DANA F., *Overestimating Ballistic Flash with Biased Linear Regression*. AFIT/ENS/13M-13. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: AFMC/96 TG. [COA]

OZDEMIR, ALHMET, *Evaluating Courses of Actions at the Strategic Planning Level*. AFIT/ENS/13M-14. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: TuAF. [COA]

PEK, EDMUND K., *Development of Availability and Sustainability Spares Optimization Models for Aircraft Repairables*. AFIT/ENS/13S-4. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: MINDEF. [COA]

RABON, ROBERT S., *Continuous Process Improvement at Tinker Air Logistics Complex*. AFIT/ENS/13M-16. Faculty Advisor: Dr. Kenneth L. Schultz. Sponsor: AFMC/A4. [COA]

RITTER, SEAN C., *An Examination of Statistical Rigor Infused into the KC-46 Flight Test Program*. AFIT/ENS/13M-18. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD. [COA]

ROBERTS, MATTHEW D., *An Empirical Investigation of USAF Logistics Readiness Officer Mission Sets*. AFIT/ENS/13M-19. Faculty Advisor: Maj Christian E. Randall. Sponsor: HQ USAF/A4. [COA]

SILVA, PAULA F., *Activity-Based Calculation Models for the Brazilian Air Force Cellular Unit of Intendancy*. AFIT/ENS/13M-21. Faculty Advisor: Lt Col Bradley E. Anderson. Sponsor: Brazilian Air Force. [COA]

THOMPSON, DAVID M., *USAF Aircraft Maintenance Officer Knowledge, Skills and Abilities and Commonalities among the Logistics Officer Corps*. AFIT/ENS/13M-22. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: HQ USAF/A4. [COA]

WHITSON, CHAD W., *Strategic Consolidation of Medical War Reserve Material (WRM) Equipment Unit Type Codes (UTC) Assemblages*. AFIT/ENS/13M-23. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AFMLO. [COA]

5.5.3. GRADUATE RESEARCH PAPERS

ANDERSON, JASON R., *Drawing the Red Line: Cost Benefit Analysis on Large Life Rafts*. AFIT/ENS/GRP/13J-1. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: AMC/A3. [COA]

BERGIN, DAVID M., *Use of Demographics to Predict High Risk Individuals for Suicide*. AFIT/ENS/GRP/13J-15. Faculty Advisor: Lt Col Sharon G. Heilmann. Sponsor: N/A. [COA]

BROYLES, PHILIP N., *F-22 Depot Level Maintenance Delay and Disruption Record (DDR) Analysis*. AFIT/ENS/GRP/13J-16. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AFMC/309 AMXG. [COA]

CHAPA, MARK A., *Predicting Aircraft Availability*. AFIT/ENS/GRP/13J-2. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AMC/A4. [COA]

GRAHAM, STEPHEN C., *Aeromedical Evacuation Capacity Analysis for Defense Support of Civil Authorities*. AFIT/ENS/GRP/13J-3. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC/A9. [COA]

HAGES, LEE D., *Quantifying the European Strategic Airlift Gap*. AFIT/ENS/GRP/13J-4. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: EUCOM/USAFE. [COA]

HALL, ZACHARY G., *C-17A Sustainment Performance Metrics Assessment: Repair Source Impact on Sustainment for Future Business Case Analysis Development*. AFIT/ENS/GRP/13J-17. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: AFLCMC. [COA]

ISACCO, JOHN J., *Cost Avoidance Techniques for RC-135 Program Flying Training*. AFIT/ENS/GRP/13J-19. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: N/A. [COA]

LANGSTROTH, THEODORE A., IV, *Forecasting Demand for KC-135 Sorties: Deploy to Dwell Impacts*. AFIT/ENS/GRP/13J-15. Faculty Advisor: Lt Col Bradley E. Anderson. Sponsor: AMC/A9. [COA]

MCALLISTER, ROBERT D., *Overcoming KC-10 Formal Training Unit Pilot Production Challenges*. AFIT/ENS/GRP/13J-6. Faculty Advisor: Lt Col Doral E. Sandlin. Sponsor: AMC/60 OG. [COA]

MORALES, MICHAEL, *Managing Airborne Relief during International Disasters*. AFIT/ENS/GRP/13J-7. Faculty Advisor: Lt Col Doral E. Sandlin. Sponsor: AFRC. [COA]

OELRICH, AARON J., *AMD and TACC Consolidation: A Delphi Study*. AFIT/ENS/GRP/13J-8. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: AMC/TACC. [COA]

PANKOSKI, JEREMY L., *A Delphi Study to Determine Variables for Predictive MICAP Modeling*. AFIT/ENS/GRP/13J-21. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AFMC/SCOG. [COA]

PIPER, RALPH E., *"To Be or Not To Be" ...Perceived Benefits of Mentoring in The United States Air Force*. AFIT/ENS/GRP/13J-22. Faculty Advisor: Lt Col Sharon G. Heilmann. Sponsor: N/A. [COA]

RYAN, LISA B., *Advancing Forward-Looking Metrics: A Linear Program Optimization and Robust Variable Selection for Change in Stock Levels as a Result of Recurring MICAP Parts*. AFIT/ENS/GRP/13J-9. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: AFMC/AFSC. [COA]

SIMONCIC, ADAM D., *Aircraft Block Speed Calculations for JOSAC/USTRANSCOM Aircraft Using Linear Regression*. AFIT/ENS/GRP/13J-23. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM. [COA]

SIVILLE, JAMES L., *The Air Mobility En Route System: A Paradigm Shift?* AFIT/ENS/GRP/13J-10. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AMC/A8. [COA]

SUMMERS, MARC W., *E² Cargo Transport-The Necessary Inclusion of Primary Oceanic Airlift*. AFIT/ENS/GRP/13J-11. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AMC/A9. [COA]

SZWARC, MEGHAN M., *The Air Force System Acquisition Management Manpower Regression Analysis*. AFIT/ENS/GRP/13J-24. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: AFMA. [COA]

THEISS, RYAN L., *Identifying Factors that Most Strongly Predict Aircraft Reliability Behavior*. AFIT/ENS/GRP/13J-12. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AMC/A9. [COA]

THOMAS, MARK R., *Determining Intra-Theater Airlift Requirements from Number of Personnel Deployed in a Region*. AFIT/ENS/GRP/13J-13. Faculty Advisor: Lt Col Doral E. Sandlin. Sponsor: AMC/A9. [COA]

WADDELL, ELWOOD T., JR., *Online Cluster Analysis Supporting Real Time Anomaly Detection in Hyperspectral Imagery*. AFIT/ENS/GRP/13J-25. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/RV. [COA]

WICK, STEVEN P., *Incentivizing CRAF Beyond 2014*. AFIT/ENS/GRP/13J-14. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC/A9. [COA]

5.5.4. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliations are listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

AHNER, DARRYL K.,

Assistant Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date 2010; Director, Center for Operational Analysis, Appointment Date, May 2011; Director, Scientific Test and Analysis (STAT) for Test and Evaluation (T&E) Center of Excellence, Appointment Date 2012; BS, Mechanical Engineering, United States Military Academy, 1990; MS, Applied Mathematics, Rensselaer Polytechnic Institute, 1999; MS, Operations Research & Statistics, Rensselaer Polytechnic Institute, 1999; PhD, Systems Engineering, Boston University, 2005. Dr. Ahner's research interests include approximate dynamic programming applications to control of complex systems, mathematical representation of information flow from sensors to decision makers, mathematical control theory and model predictive control of complex systems, missile defense, combat modeling algorithm development, artificial intelligence of robotic systems, and representations of irregular warfare. Dr. Ahner is a Member of the Board, Military Operations Research Society. Tel 937-255-6565 x4708 (DSN 785-6565 x4708), email: Darryl.Ahner@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"A System of Equations to Capture SSTRO Dynamics." Sponsor: CAA. Funding: \$200,000. [COA]

"Joint Aerial Layer Network (JALN) Development of the Command and Control (C2) Measure of Effectiveness Development." Sponsor: AFC2IC. Funding: \$308,000 – Ahner 50%, Weir 50%. [COA]

"Methods of Determining Best Mix Options for Directed and Kinetic Energy Weapons." Sponsor: AFRL/RW. Funding: \$100,000. [COA]

"T-X Source Selection Methodology and Tool Description." Sponsor: AFLCMC. Funding: \$40,000. [COA]

REFEREED JOURNAL PUBLICATIONS

Ahner D.K., 2013, "Scientific Test and Analysis Techniques (STAT) in Test and Evaluation (T&E) Center of Excellence (COE): Designing and Implementing Statistical Rigor into Test and Evaluation for the Department of Defense," *ITEA Journal*, 199-201, Vol. 34 No. 2 Jun 2013. [COA]

Hackleman, A.S., Johnson, A.W., and Ahner, D.K., 2013, "Nuclear Enterprise Performance Measurement," *Journal of Defense Modeling and Simulation*, published on-line 26 Mar 2013, DOI: 10.1177/1548512912445468. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Ahner, D.K., Gibson, S., Parson, C., and Weiblen, J., "Deployment Impacts on U.S. Air Force Junior Officer Retention: What Really Matters?" *Proceedings of the Western Decision Sciences Institute Conference, 2013*. [COA]

Ahner, D.K., Boehmke, B., Wynkoop, C., and Fryman, M., "The Effect of Using Semivariance for A Lead Time Demand Inventory Model," *Proceedings of the Western Decision Sciences Institute Conference, 2013*. [COA]

Ahner, D.K., Parson, C., and Russell, B., "Operational Simulation, Modeling, and Analysis of Mission Planning at the 618th Tanker Airlift," *Proceedings of the 2013 Industrial and Systems Engineering Research Conference (ISERC)*, A. Krishnamurthy and W.K.V. Chan, Eds. [COA]

Ahner, D.K., and Parson, C., "Optimal Methods for Interceptor Allocation in a Weapon-Target Assignment Framework," Proceedings of the *2013 Industrial and Systems Engineering Research Conference (ISERC)*, A. Krishnamurthy and W.K.V. Chan, Eds. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Morris, J.F., Deckro, R.F., Ahner, D.K., Bulutoglu, D.A., and Hamill, J.T., (2012) "DOE for Assessing Social Network Analysis Techniques," INFORMS Annual Meeting 2012, Phoenix, AZ, Oct 2012. [COA]

Morris, J.F., Deckro, R.F., Ahner, D.K., Bulutoglu, D.A., and Hamill, J.T., (2012) "Statistical Analysis of Social Network Analysis Methodologies with Design of Experiments and Quantile Regression," The 29th International Military Operational Research Symposium, Shirrell Heath, Southampton, UK, 2012. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Saie, C., Ahner, D.K., "Understanding the Instruments of National Power through a System of Differential Equations," INFORMS Annual Meeting 2012, Phoenix, AZ, Oct 2012. [COA]

Reviewer for MORS journal.

Reviewer of Army Research Office proposals.

As Director, OSD Scientific Test and Analysis Techniques in Test & Evaluation Center of Excellence assisted in the STAT curriculum update within Defense Acquisition University test courses.

2013 DOT&E report to Congress highlights the STAT T&E COE and AFIT's test & evaluation research consortium as a key advisory group for improving scientific rigor of testing across DOD.

2013 DASD (DT&E) report to Congress includes the COE as a major effort to accomplish the STAT Implementation Plan.

ANDERSON, BRADLEY E., Lt Col,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences, AFIT
Appointment Dates: 2002-2009, 2011 (AFIT/ENS); BS, Meteorology, University of Wisconsin - Madison, 1990; MS, Logistics Management, Air Force Institute of Technology, 1996; MB, Business, Indiana University - Bloomington, 2002; PhD, Business, Indiana University - Bloomington, 2002. Lt Col Anderson's research interests include inventory management, operations management, forecasting, scheduling, space logistics, supply chain management, algorithms, deterministic modeling, and heuristic algorithms.

REFEREED JOURNAL PUBLICATIONS

Anderson, B.E., Blocher, J.D., Brethauer, K.M., and Venkataramanan, M.A., 2013, "An Efficient Network-Based Formulation for Sequence Dependent Setup Scheduling on Parallel Identical Machines," *Mathematical and Computer Modeling*, Vol. 57, Issues 3-4, Feb 2013, P.483-493. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Prevett, T., and Anderson, B.E., "Sealift or Airlift for Global Mobility," published in the proceedings of the *National Decision Sciences Institute (DSI) Annual Meeting* in San Francisco, CA, Nov 2012. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Guest Editor of the Journal of Defense Modeling & Simulation Special Issue on Fuel Conservation and Alternative Energy in the Department of Defense.

Consulted with AFRC Propulsion Directorate Energy Office on using Liquid Natural Gas in USAF aircraft.
[COA]

BAUER, KENNETH W.,

Professor of Operations Research, Department of Operational Sciences; Program Chair, PhD, Operations Research, Department of Operational Sciences, AFIT Appointment Date: 1996 (AFIT/ENS); Director, Sensor Fusion Laboratory; BS, Miami University (Ohio), 1976; MEA, University of Utah, 1980; MS, Air Force Institute of Technology, 1981; PhD, Purdue University, 1987. Dr. Bauer's research interests include pattern recognition, applied multivariate statistics, and statistical aspects of neural networks; all usually within the specific application area of automatic target recognition and more recently hyper-spectral imaging processing. Tel. 937-255-6565 x4328 (DSN 785-6565 x4328), email: Kenneth.Bauer@afit.edu

REFEREED JOURNAL PUBLICATIONS

Steward, B.J., Bauer, K.W., and Perram, G.P., 2012, "Remote discrimination of large-caliber gun firing signatures," *The Journal of Applied Remote Sensing*, 6 (1), 063607 (Dec 05, 2012); doi: 10.1117/1.JRS.6.063607. [COA]

Johnson, R.J., Williams, J.P., Bauer, K.W., 2012, "AutoGAD: An Improved ICA-Based Hyperspectral Anomaly Detection Algorithm," *IEEE Transactions on Geoscience and Remote Sensing*, Vol. 51, No.6, pp. 3492-3503, doi: 10.1109/TGRS.2012.2222418. [COA]

Williams, J.P., Bauer, K.W., and Friend, M.A., 2012, "Further Extensions to Robust Parameter Design: Three Factor Interactions with an Application to Hyperspectral Imagery," *International Journal of Quality engineering & Technology*, Vol. 3, No. 3 (2013) pp. 204 - 218. [COA]

Mindrup, F.M., Friend, M.A., Bauer, K.W., 2012, "Small sample training and test selection method for optimized anomaly detection algorithms in hyperspectral imagery," *The Journal of Applied Remote Sensing*, 0001; 6 (1):063563-1-063563-21. [COA]

Williams, J.P., Bauer, K.W., and Friend, M.A., 2012, "Clustering Hyperspectral Imagery for improved Adaptive Matched Filter Performance," *The Journal of Applied Remote Sensing*, 7 (1), 073547 (Jun 05, 2013); doi: 10.1117/1.JRS.7.073547. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Bihl, T., and Bauer, K.W., "Data Mining and Analyzing Basic Features of the State of the Union Addresses," *2013 MAA Ohio Chapter Meeting, Denison University*, Apr 5-6, 2013. [COA]

Situ, J., Bihl, T., Bauer, K.W., and Friend, M.A., "Combat Identification of Synthetic Aperture Radar Images using Contextual Features and Bayesian Belief Networks," *80th Military Operations Research Society Symposium*, United States Air Force Academy, 2012. [COA]

Friesen, K., Bihl, T., Bauer, K.W., Williams, J., and Friend, M.A., "Automatic Combat Identification and Out of Library Considerations for Hyperspectral Imagery," *80th Military Operations Research Society Symposium*, United States Air Force Academy, 2012. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

ENS OR PhD program director.

Reviewer for IEEE Transactions in Image Processing.

Reviewer for the 2013 Winter Simulation Conference.

CHRISSIS, JAMES W.,

Associate Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 1987 (AFIT/ENS); BS, University of Pittsburgh, 1975; MS, Virginia Polytechnic Institute and State University, 1977; PhD, Virginia Polytechnic Institute and State University, 1980. Dr. Chrissis' research interests include mathematical programming, optimization, engineering design optimization, simulation-driven optimization, and integer modeling. Dr. Chrissis has been a member of the faculties of Virginia Tech and the University of South Florida. He is a member of the Institute for Operations Research and Management Sciences (INFORMS), the Military Operations Research Society (MORS), The American Institute for Aeronautics and Astronautics (AIAA), and Sigma Xi. Tel. 937-255-3636 x4606 (DSN 785-3636 x4606), email: James.Chrissis@afit.edu

REFEREED JOURNAL PUBLICATIONS

Herbranson, T.J., Deckro, R.F., Chrissis, J.W., and Hamill, J.T., 2012, "Considering the Isolation Set Problem," *European Journal of Operational Research*," <http://dx.doi.org/10.1016/j.ejor.2012.11.016>. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Parson, C., Chrissis, J.W., O'Hara, R., Palazotto, A.N., (2013) "Direct Search Optimization of a Flapping Micro Air Vehicle Wing," Presented at the 9th AIAA MDO Specialist Conference, Boston, MA, Apr 2013. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AIAA - Member of and Secretary for the Multidisciplinary Optimization Technical Committee (MDO-TC), General Chair for the 2012 MDO Conference held in Indianapolis, Abstract reviewer for every conference held in the past year, Judge for the student paper competition.

Reviewed papers for Optimization and Engineering and European Journal of Operational Research. [COA]

COCHRAN, JEFFERY K.,

Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2007 (AFIT/ENS); BSE, Purdue University, 1973; MSNE, Purdue University, 1976; MSIE, Purdue University, 1982; PhD, Purdue University, 1984. Dr. Cochran's research interests include operations of high technology entity flow systems, heuristic optimization of stochastic models, and Markov chain, queuing network, and probability modeling. Tel. 937-255-3636 x4521 (DSN 785-3636 x4521), email: Jeffery.Cochran@afit.edu

REFEREED JOURNAL PUBLICATIONS

Dillenburg, S.P., Cochran, J.K., and Cammarano, V.R., 2013, "Supply Airdrop Collateral Damage Risk Estimation with the Bivariate Normal Distribution," *Socio-Economic Planning Sciences* Vol. 47, No. 1, pp. 9-19, Jan 2013. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Vaira, B.J., and Cochran, J.K., "Estimating Aircraft/Avian Encounter Probabilities and Risk with Extended Spatial Poisson Processes," *IIE Industrial System Engineering Research Conference*, San Juan, PR (May 2013).

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Editorial Board: International Journal of Mathematics in Operational Research, International Journal of Industrial and Systems Engineering, International Journal of Simulation and Process Modeling, Journal of Design and Manufacturing Automation, Computers in Industry.

Participated in the National Science Foundation's extramural funding proposal reviewer pool.

CUNNINGHAM, WILLIAM A.,

Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Program Chair, MS in Logistics and Supply Chain Management, Department of Operational Sciences, AFIT Appointment Date: 1994 (AFIT/ENS); BS, Business Administration, Missouri Southern State College, 1976; MS, Economics, Oklahoma State University, 1979; PhD, Economics, University of Arkansas, 1986. Dr. Cunningham's research interests include strategic mobility, cost/benefit analysis, econometric modeling, costing privatization and A-76 studies, modal choice networks, location analysis, supply chain management, and RFID. Tel. (937) 255-6565 x4283 (DSN 785-6565 x4283), email: William.Cunningham@afit.edu

REFEREED JOURNAL PUBLICATIONS

Brady, S., Cunningham, W., Teagan, S., 2012, "Civil Reserve Air Fleet: The Impact of 9/11/2001," *Journal of Transportation Law, Logistics and Policy*, Vol. 79, No.20, pp. 163-191. 2012. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Bell, J., Cunningham, W.A., Ehasz, R., "Cost Benefit Analysis of Avian Radar Systems," *Western Decisions Science Institute Annual Meeting*, Long Beach, CA. Mar 26-29, 2013. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Examiner for Transportation and Economics Module for Certified Transportation and Logistics (CTL) certification for American.

Program Manager, Graduate Logistics and Supply Chain Management program- ENS

Chair, EN IRB Review Committee.

Chair, EN Survey Control Panel.

Editorial Review Board for Journal of Transportation Management (2 articles-Profession).

Book reviewer for Army Logistician.

Reviewer for Western Decision Science Institute.

DECKRO, RICHARD F.,

Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 1994 (AFIT/ENS); Director, Future Operations Investigation Laboratory, BSIE, State University of New York at Buffalo, 1972; MBA, Kent State University, 1973; DBA, in Decision Sciences, Kent State University, 1976. Dr. Deckro's research, teaching, and consultation interests include the areas of information operations and information assurance, reconstruction and stabilization, measures of effectiveness and assessment, behavioral modeling including social network analysis, modeling fourth generation operations, counter insurgency and irregular warfare, applied mathematical programming and optimization, project and program management, modeling and analysis, space applications, campaign modeling, technology selection and management, scheduling, network modes, advanced manufacturing methods, multi-criteria decision making, and decision analysis. Dr. Deckro is the editor of *Military Operations Research* and a Fellow of the Military Operations Research Society. Tel. 937-255-6565 x4325 (DSN 785-6565 x4325), email: Richard.Deckro@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"JWAC AFIT Interaction." Sponsor: JWAC. Funding: \$125,000 – Deckro 80%, Ahner 10%, Black 10%. [COA]

REFEREED JOURNAL PUBLICATIONS

Chaney, A.D., Deckro, R.F., and Moore, J.T., 2013, "Scheduling Reconstruction Operations with Modes of Execution," *Journal of the Operational Research Society*, Vol. 64, Issue 6, Jun 2013, pp. 898–911.

Morris, J.F., and Deckro, R.F., 2013, "SNA Data Difficulties with Dark Networks," *Behavioral Sciences of Terrorism and Political Aggression*, Vol. 5, Issue 2, 2013, pages 70-93. (Special Issue: Applying Social Network Analysis to Terrorism)

Herbranson, T.J., Deckro, R.F., Chrissis, J.W., and Hamill, J.T., 2012, "Considering the Isolation Set Problem," *European Journal of Operational Research*," <http://dx.doi.org/10.1016/j.ejor.2012.11.016>.

CONFERENCE PRESENTATIONS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Guzman, J.D., Deckro, R.F., Robbins, M.J., Morris, J.F., and Ballester, N.A., (2013) "An Analysis of Some Social Network Measures," Military Operations Research Society Symposium 81.1, presented via DCO, 14 Jun 2013.

Morris, J.F., Deckro, R.F., Ahner, D.K., Bulutoglu, D.A., and Hamill, J.T., (2012) "DOE for Assessing Social Network Analysis Techniques," INFORMS Annual Meeting 2012, Phoenix, AZ, Oct 2012.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Deckro, R.F., "Pointers on Getting Published," MORS-MAS Student Webinar - How and Why to Publish. 20 Sep 2013.

Tau Beta Pi Executive Committee.

Editor, Military Operations Research.

Advisory Director, Military Operations Research Society.

Member, MORS Publication Committee and MORS Heritage Committee.

Member, Peacekeeping and Stability Operations Institute Academic Consortium.

Judge for the US Army's 2012 Dr. Wilbur B. Payne Memorial Award for Excellence in Analysis.

Defense Intelligence Socio-Cultural Capabilities Council (DISCCC).

FRIEND, MARK A., Lt Col,

Assistant Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2010 (AFIT/ENS); Chief, Operations Research Division; BS, Computer Science, Texas Christian University, 1996; MS, Operations Research, Air Force Institute of Technology, 1998; PhD, Operations Research, Air Force Institute of Technology, 2007. Major Friend's research interests include pattern recognition techniques applied to the area of automatic target recognition, applied multivariate statistics, and mobility modeling and analysis.

REFEREED JOURNAL PUBLICATIONS

Williams, J.P., Bauer, K.W., and Friend, M.A., 2012, "Further Extensions to Robust Parameter Design: Three Factor Interactions with an Application to Hyperspectral Imagery," *International Journal of Quality Engineering & Technology*, Vol. 3, No. 3 (2013) pp. 204 - 218. [COA]

Mindrup, F.M., Friend, M.A., Bauer, K.W., 2012, "Small sample training and test selection method for optimized anomaly detection algorithms in hyperspectral imagery," *The Journal of Applied Remote Sensing*, 0001; 6 (1):063563-1-063563-21. [COA]

Williams, J.P., Bauer, K.W., and Friend, M.A., 2012, "Clustering Hyperspectral Imagery for Improved Adaptive Matched Filter Performance," *The Journal of Applied Remote Sensing*, 7 (1), 073547 (Jun 05, 2013); doi: 10.1117/1.JRS.7.073547. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Friesen, K., Bihl, T., Bauer, K.W., Williams, J., and Friend, M.A., "Automatic Combat Identification and Out of Library Considerations for Hyperspectral Imagery," *80th Military Operations Research Society Symposium*, United States Air Force Academy, 2012. [COA]

GEFFRE, JENNIFER L., Maj,

Instructor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2012 (ENS); BS, Mathematics, Colorado State University; MS, Operations Research, Air Force Institute of Technology, 2007. Major Geffre's research interests include risk analysis and management, decision analysis, information operations, influence and social network models, network optimization, data mining and multivariate analysis. Tel 937-255-3636 x4646, (DSN 785-3636 x 4646), e-mail: Jennifer.Geffre@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Geffre, J., and Brown, D.E., 2013, "Quantitative Framework for Strategic Spatial Decisions," *Western Decision Science Institute*, Long Beach, CA, 27 Mar 2013. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Geffre, J., and Brown, D. E., "Temporal Spatial Predictions: A Case Study in Africa," *Military Operations Research Virtual Symposium 81.1*, Virtual/Washington DC, 14 Jun 2013. Selected best of Composite Group G-Hybrid Warfare (#1/32) and nominated for the 2014 MORS Barchi Prize. [COA]

AFIT Faculty Development – Female Faculty Mentoring Community Liaison.

COA Deputy Director – Operations Research.

Secretary of the Cincinnati/Dayton chapter of INFORMS.

HEILMANN, SHARON G., Lt Col,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences, AFIT Appointment Date: 2004-2007 (AFIT/ENV), 2010 (AFIT/ENS), Deputy Department Head; BS, Organizational Communication, Eastern Michigan University, 1988; MA, Organizational Communication, Ohio University, 1989; MS, Logistics Management, Air Force Institute of Technology, 1998; MB, Indiana University, 2003; PhD, Organizational Behavior & Human Resource Management, Indiana University, 2005. Lt Col Heilmann's research interests include organizational turnover, mentoring, and training transfer.

HILL, RAYMOND R., Jr.,

Professor of Operations Research, Department of Operational Sciences; Program Chair, Graduate Test and Evaluation Certificate, Department of Operational Sciences, AFIT Appointment Dates: 1997-2002, 2008 (AFIT/ENS); BS, Mathematics, Eastern Connecticut State University, 1983; MS, Operations Research, Air Force Institute of Technology, 1988; PhD, Industrial and Systems Engineering, The Ohio State University, 1996. Dr. Hill's research interests include applied statistics, in particular the application of design of experiments methodologies to test and evaluation; mathematical optimization, in particular the use of heuristic search methods for addressing particularly hard problems; and applied simulation modeling and analysis with particular interests in the area of agent-based modeling and the validation of such models. Tel. 937-255-6565 x7469 (DSN 785-6565 x7469), email: Raymond.Hill@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Force Structure Analysis Tool Development.” Sponsor: AF/A9. Funding: \$172,157 – Hill 40%, Johnson 60%. [COA]

“The Science of Test: Advanced Test and Evaluation in Support of the DOD Test and Evaluation Enterprise.” Sponsor: OSD. Funding: \$683,871. [COA]

REFEREED JOURNAL PUBLICATIONS

Storm, S., Hill, R.R., and Pignatiello, J.J., 2013, “A Response Surface Methodology for Modeling Time Series Response Data,” *Quality and Reliability Engineering International*, Vol. 29, No. 5: 771-778. DOI: 10.1002/qre.1442. [COA]

Chambal, S.P., Kitchen, J., Hill, R.R., and Gutman, A.J., 2013, “Acquisition and Testing, DT/OT Testing: The Need for Two-Parameter Requirements,” *Quality and Reliability Engineering International*, Vol. 29, No. 5, pp: 691-697. DOI: 10.1002/qre.1419. [COA]

Hardman, N., Colombi, J., Jacques, D., Hill, R.R., Miller, J., 2013, “Requirements Elicitation through Legacy Mishap Analysis,” *AIAA Journal of Aerospace Computing, Information, and Communication*, Vol. 10, No. 3, 105-113. [COA]

Heath, B., Ciarallo, F., and Hill, R.R., 2012, “Validation in the Agent-Based Modeling Paradigm: Problems and a Solution,” *International Journal of Simulation and Process Modeling*, Vol. 7, No. 4, 229-239. [COA]

Hill, R.R., 2012, “T&E Workforce Development-Do Not Forget Education,” *International Test and Evaluation Journal*, Vol. 33, No. 4, 333-338. [COA]

Garza, R., Hill, R.R., and Mattioda, D.D., 2013, “Using Simulation to Analyze the Maintenance Architecture for an Air Force Weapon System,” *Simulation: Transactions of the Society for Modeling and Simulation International*, 89(3): 294-305, DOI:10.1177/0037549712461382. [COA]

Hiremath, C. and Hill, R.R., 2013, “First-Level Tabu Search Approach for Solving the Multiple-Choice Multidimensional Knapsack Problem,” *International Journal of Metaheuristics*, Vol. 2, No. 2, 174-199. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Bova, M., Ciarallo, F., and Hill, R.R., “A Prototype Model of Fire Ignition from Ballistic Impacts,” *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico. [COA]

Gutman, A.T., White, E., and Hill, R.R., “Large Screening Experiments: An Overview of Supersaturated Designs for Practitioners,” *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico. [COA]

Leiter, M., Miller, J.O., and Hill, R.R., “Impact of Manpower Reduction at the Tanker Airlift Control Center,” *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Hill, R.R., “Simulation: Making Decisions in a Complex World,” *OR/MS Today*, Aug 2013, Vol. 40, No. 4, 58-59. [COA]

AFIT/EN Promotion and Tenure Committee Chair.

AFIT/ENS Director of Test & Evaluation Certificate Program.

Associate Editor: Naval Research Logistics (NRL), Military Operations Research (MOR), Journal of Defense Modeling and Simulation (JDMS), Journal of Simulation (JOS), International Journal of Mathematics in Operations Research.

2013 Winter Simulation Conference: General Chair, Military Track Assistant Chair.

Consultation support to AFMC/A9 for their Depot Engine study. [COA]

Consultation support to AETC-SAS for the Feasibility Assessment of the T-6A as a Low Slow Airborne Threat Response Platform test plan. [COA]

Subject Matter Expert review for Air Force Office of Scientific Research STTR Solicitation proposals for “Statistically Defensible Comparison of Similar but Disparate Tests,” AF12-BT01. [COA]

Experimental Design consultation support to 96th OL, Wright Patterson AFB. Assessment of their laser test plan. [COA]

HUSCROFT, JOSEPH R., Lt Col,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Deputy Department Head of Operational Sciences; AFIT Appointment date: 2012 (AFIT/ENS); BS, Behavioral Science, United States Air Force Academy, 1994; Master of Public Administration, Troy State University, 2002; MS, Logistics Management, Air Force Institute of Technology, 2004; PhD, Management, Auburn University, 2010. Lt Col Huscroft’s research interests include supply chain management, reverse logistics, reverse logistics metrics, innovation and flexibility in the supply chain, operations management, information systems impact on the supply chain, and transportation and distribution. Tel. 937-255-3636 x 4533 (DSN 785-3636 x4533), e-mail: Joseph.Huscroft@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AFIT CORONA 2013 Team Lead.

Invited reviewer: International Journal of Physical Distribution & Logistics Management, International Journal of Logistics Management.

Partnering research with AFMC on Repair Network Integration and fostering future projects. [COA]

JOHNSON, ALAN W.,

Associate Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Program Chair, PhD, Logistics, Department of Operational Sciences, AFIT Appointment Date: 2004 (AFIT/ENS); BS, Mechanical Engineering, Montana State University, 1982; MS, Systems Management, Air Force Institute of Technology, 1989; PhD, Industrial and Systems Engineering, Virginia Polytechnic Institute and State University, 1996. Dr. Johnson’s research interests include space logistics, strategic mobility, discrete-event simulation, logistics management, reliability and maintainability, and discrete optimization and heuristics. Tel. 937-255-3636 x4703 (DSN 785-3636 x4703), email: Alan.Johnson@afit.edu

SPONSOR FUNDED EDUCATIONAL PROJECTS

“Research, Analysis and Transition Support to the Directorate of Logistics and Sustainment Air Force Sustainment Center.” Sponsor: AFSC. Funding: \$440,000. [COA]

REFEREED JOURNAL PUBLICATIONS

Hackleman, A.S., Johnson, A.W., and Ahner, D.K., 2013, "Nuclear Enterprise Performance Measurement" *Journal of Defense Modeling and Simulation*, published on-line 26 Mar 2013, DOI: 10.1177/1548512912445468. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Breitbart, T., Johnson, A., Weir, J., and Brown, G., "Afghanistan Air Cargo Routing – A Systems Approach." *Proceedings of the IIE Industrial and Systems Engineering Research Conference, San Juan, Puerto Rico*, 18-22 May 2013. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Schultz, K L., Johnson, A.W., and Rabon, R., (2013) "Success and Failure of Continuous Process Improvement Teams in the Same Organization," INFORMS Annual Conference. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

EN Logistics PhD Program Director.

Associate Editor, IIE Transactions.

Member of the Editorial Board, International Journal of Operations Research and Information Systems (IJORIS).

Reviewer: European Journal of Operational Research, MOR Journal, Journal of Defense Modeling and Simulation, Computers and Industrial Engineering.

Proceedings reviewer: 2013 ISERC, 2013 Winter Simulation Conference.

LUNDAY, BRIAN J., LTC,

Assistant Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2013 (AFIT/ENS); BS, Mechanical Engineering, U.S. Military Academy, West Point, 1992; MS, Industrial Engineering, University of Arizona, 2001; PhD, Industrial and Systems Engineering, Virginia Polytechnic Institute, 2010. LTC Lunday's research interests include network interdiction, game theoretic resource allocation, and public service applications; mathematical modeling, global optimization algorithms, and heuristic development. Tel. 937-255-3636x4624 (DSN 785-3636x4624), email: Brian.Lunday@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Member, U.S. Army Operations Research/Systems Analyst (ORSA) Education Committee.

Reviewer, European Journal of Operational Research.

MATTIODA, DANIEL D., Lt Col,

Assistant Professor of Logistics Management and Supply Chain Management, Department of Operational Sciences, AFIT Appointment Date: 2007-2010, 2011 (AFIT/ENS); Chief, Logistics Division; BS, Professional Aeronautics, Embry Riddle Aeronautical University 1997; MS, Logistics and Acquisition Logistics Management, Air Force Institute of Technology, 2002; PhD, Business Administration; Concentration: Marketing/Supply Chain Management, The University of Oklahoma-Norman, 2007. Major Mattioda's research interests include collaboration and flexibility in the supply chain, reverse logistics, international logistics, lean, agile logistics, and using simulation to model supply chain processes.

REFEREED JOURNAL PUBLICATIONS

Garza, R., Hill, R.R., and Mattioda, D.D., 2013, "Using Simulation to Analyze the Maintenance Architecture for an Air Force Weapon System," *Simulation: Transactions of the Society for Modeling and Simulation International*, Vol. 89, No. 3, pp. 294-305, 2013. [COA]

Lynch, S., Heminger, A.R., and Mattioda, D.D., 2013, "Tanker Acquisition: A Systems Engineering Perspective," *Air and Space Power Journal*, Vol. 27, No. 3, pp. 83-91. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Williams, D., Miller, J.O., and Mattioda, D. D., (2013), "Simulation and Analysis of EXPRESS Run Frequency," Winter Simulation Conference, 8-11 Dec 2013, Washington DC. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Co-Chair, Military Applications Track, Western Decision Sciences Institute Annual Conference, Long Beach, CA, 2013. [COA]

Reviewer, International Journal of Logistics and Physical Distribution (IJPDL), May 2012-Present. [COA]

MILLER, JOHN O.,

Associate Professor of Operations Research, Department of Operational Sciences; Program Chair, MS in Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2002 (AFIT/ENS); Director, Combat Modeling Laboratory; BS, Biology, United States Air Force Academy, 1980; MBA, University of Missouri at Columbia, 1983; MS, Operations Research, Air Force Institute of Technology, 1987; PhD, Industrial Engineering, The Ohio State University, 1997. Dr. Miller's research interests include computer simulation, ranking and selection, agent based modeling, combat modeling, network centric warfare, high performance computing, applied statistics, and nonparametric statistics. Tel. 937-255-6565 x4326 (DSN 785-6565 x4326), email: John.Miller@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Leiter, M., Miller, J.O., Hill, R.R., "Impact of Manpower Reductions at the Tanker Airlift Control Center," *Proceedings of the 2013 Industrial Engineering Research Conference*, pp. 2128-2137, San Juan, Puerto Rico, 18-22 May 2013. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

ENS Program Director Graduate Operations Research Program.

Associate Editor for International Journal of Operations Research.

Journal referee for Military Operations Research, International Journal of Logistics: Research and Applications, The Journal of Defense Modeling and Simulation.

WSC 13 Conference Committee – Registration chair, Military Track Committee.

NURRE, SARAH G.,

Assistant Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2013 (AFIT/ENS); BS, Mathematical Sciences, Rensselaer Polytechnic Institute, 2007; MEng, Industrial and Management Engineering, Rensselaer Polytechnic, 2011; PhD, Decision Sciences and Engineering Systems, Rensselaer Polytechnic Institute, 2013. Dr. Nurre's research interests include network optimization, scheduling, integer programming, and applied deterministic optimization. Tel. 937-255-6565 x4319 (DSN 785-6565 x4319), email: Sarah.Nurre@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Institute for Industrial Engineers (IIE) Reviewer.

Reviewer for IIE Transactions.

OGDEN, JEFFERY A.,

Associate Professor of Logistics and Supply Chain Management, Department of Operational Sciences, AFIT Appointment Date: 2006 (AFIT/ENS); BS, Accounting, Weber State University, 1998; MBA with emphasis in Supply Chain Management, Arizona State University, 2000; PhD, Business Administration with emphasis in Supply Chain Management, Arizona State University, 2003. Dr. Ogden's research interests include supply chain management, supply base reduction ERP, implementation E-marketplaces RFID, supply chain quality purchasing, strategies buyer-supplier relationships, supply chain interoperability, supply chain services, and qualitative research methods. Tel. 937-255-3636 x4653 (DSN 785-3636 x4653), email: Jeffrey.Ogden@afit.edu

REFEREED JOURNAL PUBLICATIONS

Brewer, B., Ashenbaum, B., and Ogden, J.A., 2013, "Connecting strategy-linked outsourcing approaches and expected performance," *International Journal of Physical Distribution and Logistics Management*, Vol. 43, No. 3, 176-204. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Rubino, D. P., Ogden, J.A. and Hartman, P.L., (2013), "Insourcing within the U.S. Department of Defense: Critical Success Factors Impacting the Purchasing Function and Public/Private Partnerships," 23rd Annual North American Research and Teaching Symposium, Arizona, Mar 2013. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AFIT Curriculum Development and Review Committee (CDRC) Chair.

ENS 21X Distance-Learning Degree Program Director.

Reviewer: North American Research Symposium, Journal of Business Logistics (Editorial Review Board).

OVERSTREET, ROBERT E., Maj,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Division Chief, Logistics Division, Department of Operational Sciences, AFIT Appointment Date: 2012 (AFIT/ENS); BBA, General Business, Campbell University, 1998; MS, Logistics, Air Force Institute of Technology, 2002; PhD, Management, Auburn University, 2012. Maj Overstreet's research interests include leadership in the supply chain, organizational innovativeness, lean and agile logistics, transportation, and humanitarian logistics. Tel. 937-255-3636 x 4590 (DSN 785-3636 x 4590), email: Robert.Overstreet@afit.edu

REFEREED JOURNAL PUBLICATIONS

Overstreet, R.E., Hazen, B.T., Byrd, T.A., & Hall, D.J. (2013). "Innovativeness in the Motor Carrier Industry." *International Journal of Logistics: Research and Applications*, Vol. 16, No. 5, 367–379. [COA]

Overstreet, R.E., Hanna, J.B., Byrd, T.A., Cegielski, C.G., and Hazen, B.T., 2013, "Leadership style and organizational innovativeness drive motor carriers toward sustained performance," *International Journal of Logistics Management*, 24.1. [COA]

Overstreet, R.E., Hall, D.J., and Cegielski, C.G., 2013, "Predictors of the intent to adopt preventive innovations: A meta-analysis," *Journal of Applied Social Psychology*, 43(5), 936–946. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

EN Faculty Advisor for Sigma Iota Epsilon.

Reviewer—*International Journal of Logistics Management*.

PIGNATIELLO, JOSEPH J., Jr.,

Professor of Operations Research, Department of Operational Sciences; Head, Department of Operational Sciences, AFIT Appointment Date: 2010-2011 (AFIT/ENV), 2011 (AFIT/ENS); BS, Mathematics, University of Massachusetts; MS, Industrial and Systems Engineering, The Ohio State University, 1979; PhD, Industrial and Systems Engineering, The Ohio State University, 1982. Dr. Pignatiello's research interests include statistical process monitoring, change-point models, design and analysis of experiments, reliability, statistical data analysis, robust design, and six sigma methods. Dr. Pignatiello is a Fellow of the American Society for Quality, A Fellow of the Institute of Industrial Engineers, a member of the Council of Industrial Chairs of Operations Research Departments. Tel. 937-255-3636 x4311 (DSN 785-3636 x 4311); email: Joseph.Pignatiello@afit.edu

REFEREED JOURNAL PUBLICATIONS

Storm, S., Hill, R.R., and Pignatiello, J.J., 2013, "A Response Surface Methodology for Modeling Time Series Response Data," *Quality and Reliability Engineering International*, Vol. 29, No. 5: 771-778. DOI: 10.1002/qre.1442. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

McGinnity, K., Chicken, E., and Pignatiello, J.J., Jr., "Distribution-Free Changepoint Detection for Nonlinear Profiles," *Proceedings of the Industrial and System Engineering Research Conference*, San Juan, PR, May 18-22, 2013. [COA]

Girimurugan, S.B., Chicken, E., and Pignatiello, J.J., Jr., "Wavelet ANOVA for Detection of Local and Global Profile Changes," *Proceedings of the Industrial and System Engineering Research Conference*, San Juan, PR, May 18-22, 2013. [COA]

Becvarik, R., Chicken, E., Pignatiello, J.J., Jr., and Zeisset, M.S., "Alternative Upper Control Limit Methods for Change Point Detection," *Proceedings of the Industrial and System Engineering Research Conference*, San Juan, PR, May 18-22, 2013. [COA]

Cuevas, Jordan, Chicken, Eric, Girimurugan, Senthil Balaji and Pignatiello, Joseph J., Jr., "Semiparametric Changepoint Monitoring of Profile Data," *Proceedings of the Industrial and System Engineering Research Conference*, San Juan, PR, May 18-22, 2013. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Editorial Board, Quality Engineering and IIE Transactions.

Editorial Advisory Board, International Journal of Six Sigma and Competitive Advantage and International Journal of Lean Six Sigma. [COA]

Reviewer: IIE Transactions, Journal of Quality Technology, Quality Engineering, Quality and Reliability Engineering International, 2013 Industrial and Systems Engineering Research Conference.

Quality and Reliability Engineering Track Co-chair, Industrial and Systems.

Quality and Reliability Engineering Division, President.

RANDALL, CHRISTIAN E., Maj,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Program Chair, Master of Science in Logistics (ASAM) and Program Chair, Master of Science in Logistics (IDE), Department of Operational Sciences. AFIT Appointment date: 2012; BS, Business Administration, University of Phoenix, 1997; MS, Logistics Management, Air Force Institute of Technology, 2004; PhD, Business Administration (Logistics), The Ohio State University, 2013. Major Randall's research interests include social network impacts on supply chain management, resilience, and impacts of technology on logistics performance. Tel. 937-255-3636 x 4337 (DSN 785-3636 x4337), email: Christian.Randall@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Randall, C.E., "The Effects of Collaboration on the Resilience of the Enterprise: A Network-Analytic Approach," PhD Dissertation, The Ohio State University, Columbus OH, 2013. [COA]

Reviewer- Journal of Operations Management.

Collaborated with AFRL/RXMS on research on Defense E-Procurement Marketplaces. [COA]

ROBBINS, MATTHEW J., Maj,

Assistant Professor of Operations Research, Department of Operational Sciences; Division Chief, Operations Research Division, Department of Operational Sciences, AFIT Appointment Date: 2010 (AFIT/ENS); BS, Computer Systems Engineering, University of Arkansas, 1999; MS, Operations Research, Air Force Institute of Technology, 2005; PhD, Industrial Engineering, University of Illinois at Urbana-Champaign, 2010. Maj Robbins' research interests include applied mathematical programming, applied statistics, approximate dynamic programming, decision making under uncertainty, game theory, and stochastic modeling; problems related to defense (stability operations management, MEDEVAC location and dispatching, military inventory routing, and missile defense) and problems within the general area of public health (vaccine economics and transportation regulatory policies). Tel. 937-255-3636 x4539 (DSN 785-3636 x4539), email: Matthew.Robbins@afit.edu

REFEREED JOURNAL PUBLICATIONS

Jacobson, S.H., King, D.M., Ryan, K.C., and Robbins, M.J., 2012, "Assessing the Long Term Benefit of Banning the Use of Hand-Held Wireless Devices While Driving," *Transportation Research Part A: Policy and Practice*, 46 (10), 1586-1593. [COA]

CONFERENCE PRESENTATIONS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Guzman, J.D., Deckro, R.F., Robbins, M.J., Morris, J.F., and Ballester, N.A., (2013) "An Analysis of Some Social Network Measures," Military Operations Research Society Symposium 81.1, presented via DCO, 14 Jun 2013. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Journal Referee Health Care Management Science.

Journal Referee Military Operations Research.

2013 Winter Simulation Conference, Military Applications Track Coordinator.

SANDLIN, DORAL E., Lt Col,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Deputy Director, Center for Operational Analysis, Department of Operational Sciences, AFIT Appointment Date: 2010 (AFIT/ENS); BS, Civil Engineering, US Air Force Academy, 1992; MBA, Business, Rutgers University, 2004; MLM, Logistics and Supply Chain Management, Air Force Institute of Technology, 2006; MA, Logistics Management, The Ohio State University, 2009; PhD, Logistics, The Ohio State University,

2010. Lt Col Sandlin's research interests include transportation selection models, cross-functional integration, and logistics strategy. Tel. 937-255-3636 x 4740 (DSN 785-3636 x4740), email: Doral.Sandlin@afit.edu

SCHULTZ, KENNETH L.,

Associate Professor of Logistics and Supply Chain Management, Department of Operational Sciences, AFIT Appointment Date: 2011; BS, Economics, University of Pennsylvania, 1980; PhD, Operations Management, Cornell University, 1997. Dr. Schultz's research interests include improving operations management models by including the consideration of behavior issues including motivation and peer pressure in production systems and process flows. Tel. 937-255-3636 x 4725 (DSN 785-3636 x 4725), email: Kenneth.Schultz@afit.edu

REFEREED JOURNAL PUBLICATIONS

Croson, R., Schultz, K.L., Siemsen, E., and Yao, L., 2013, "Behavioral Operation, The State of the Field," *Journal of Operations Management*, V31, #1, 2013. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Schultz, K L., Johnson, A.W., and Rabon, R., (2013) "Success and Failure of Continuous Process Improvement Teams in the Same Organization," INFORMS Annual Conference. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Treasurer, Production and Operations Management Society College of Behavioral Operations.

Secretary, INFORMS Section on Behavioral Operations Management.

Hosted a PhD workshop and research seminar at Erasmus University, Rotterdam School of Management, Sep 2013. [COA]

Hosted a research seminar for faculty of the Industrial Engineering Department of Eindhoven University of Technology, Sep 2013. [COA]

SKIPPER, JOSEPH, B., Lt Col,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences, AFIT Appointment Dates: 2008-2011, 2013 (AFIT/ENS); BS, Marketing, Troy State University, 1992; MS, Logistics Management, Air Force Institute of Technology, 2002; PhD, Management, Auburn University, 2008. Lt Col Skipper's research interests include supply chain risk reduction, disruption avoidance, contingency planning, and organizational flexibility. Tel. 937-255-3636 x4538 (DSN 785-3636 x4538), email: Joseph.Skipper@afit.edu

STONE, BRIAN B., Capt,

Assistant Professor of Operations Research, Department of Operational Sciences, AFIT Appointment Date: 2013 (AFIT/ENS); BS, Mathematics, Truman State University, 1999; MS, Operations Research, Air Force Institute of Technology, 2008; PhD, Industrial Engineering, Arizona State University, 2013. Capt Stone's research interests include design of experiments, response surface methodology, statistical quality control, and regression analysis. He is a member of the Institute for Operations Research and Management Science (INFORMS), the Military Operations Research Society (MORS), and the American Society for Quality (ASQ). Tel. 937-255-3636 x 4510 (DSN 785-3636 x4510), email: Brian.Stone@afit.edu

STRAKOS, JOSHUA K., Maj,

Assistant Professor of Logistics and Supply Chain Management, Department of Operational Sciences; Program Chair, Graduate Supply Chain Management Certificate, Department of Operational Sciences, AFIT Appointment Date: 2013 (AFIT/ENS); BS, Occupational Education (Human Services), Wayland Baptist University, 1999; MBA, Business Administration (Petroleum Management), University of Kansas, 2006;

PhD, Operations Management, University of Houston, 2013. Maj Strakos' research interests include government and non-government related energy topics, disaster relief supply chain management, and humanitarian logistics and supply chain management. Tel. 937-255-3636 x 4318 (DSN 785-3636 x 4318), email: Joshua.Strakos@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Strakos, J. K., Chin, W. W., "Effective Planning and Improvisation in Disaster Relief Supply Chain Management." *Proceedings of the 43rd Annual Meeting of the Decision Sciences Institute, San Francisco: Decision Sciences Institute*, San Francisco, CA, 2012. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Strakos, J. K., "Disaster relief supply chain management: The effect of organizational factors on improvisation and performance," PhD Dissertation, University of Houston, Houston, TX, 2013. [COA]

WEIR, JEFFERY D.,

Associate Professor of Operations Research, Department of Operational Sciences; Deputy Department Head, Department of Operational Sciences; Program Chair, Master of Science in Operational Analysis (IDE), Department of Operational Sciences, AFIT Appointment Dates: 2002-2008, 2009 (AFIT/ENS); BEE, Electrical Engineering, Georgia Institute of Technology, 1988; MAS, Business Administration, Embry Riddle-Aeronautical University, 1992; MS, Operations Research, Air Force Institute of Technology, 1995; PhD, Industrial Engineering & Operations Research, Georgia Institute of Technology, 2002. Dr. Weir's research interests include decision analysis, large-scale optimization, deterministic optimization, and mathematical programming. He is a member of the Institute for Operations Research and Management Science (INFORMS), the Military Operations Research Society (MORS), the Institute of Industrial Engineers (IIE) and the Decision Sciences Institute (DSI). Tel. 937-255-3636 x4523 (DSN 785-3636 x4523), email: Jeffery.Weir@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"AFRL Strategic Analysis of Lab Infrastructure." Sponsor: AFRL. Funding: \$450,240. [COA]

"ASC Prioritization." Sponsor: AFMC. Funding: \$263,868. [COA]

"JDPAC and AFIT Distribution Research Proposal." Sponsor: USTRANSCOM. Funding: \$125,000. [COA]

"Secretary of the Air Force Inspector General USAF Inspections Support (SAF/IGI Support)." Sponsor: SAF. Funding: \$20,000. [COA]

REFEREED JOURNAL PUBLICATIONS

Hu, M., Wu, T., and Weir, J.D., 2012, "An intelligent augmentation of particle swarm optimization with multiple adaptive methods," *Information Sciences Volume 213*, 5 Dec 2012, Pages 68–83. [COA]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

S. R. Soni, M. Al-Romaihi, J. R. Wirthlin, A. B. Badiru, J. D. Weir, "Analysis of Z-Pinned Laminated Composites Fatigue Test Data," *International Conference on Agile Manufacturing Systems, ICAM-2012*, Institute of Technology, Banaras Hindu University, Varanasi-221005. [COA]

Johnson, A., Breitbach, T, Weir, J.D., and Brown, G., "Afghanistan Air Cargo Routing – A Systems Approach," *Industrial and Systems Engineering Research Conference*, May 2013, San Juan, Puerto Rico. [COA]

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Associate Editor of Military Operations Research.

Reviewer: Military Operations Research, ISERC Proceedings.

5.6. DEPARTMENT OF SYSTEMS ENGINEERING AND MANAGEMENT

Access Phone: 937-255-2998, DSN 785-2998

Fax: 937-656-4699, DSN 986-4699

Homepage: <http://www.afit.edu/en/env/>

5.6.1	<u>MASTER'S THESES</u>	166
5.6.2	<u>GRADUATE RESEARCH PAPERS</u>	169
5.6.3	<u>FACULTY BIOGRAPHIES & RESEARCH OUTPUT</u>	170

5.6.1. MASTER'S THESES

- ALEJANDRO, EARL B., *Space Debris Mitigation CONOPS Development*. AFIT/ENV/13J-04DL. Faculty Advisor: Lt Col Brent T. Langhals. Sponsor: N/A.
- BAKER, PETER A., *Development of Peptide Nanotube-Modified Biosensors for Gas-Phase Organophosphate Detection*. AFIT/ENV/13M-35. Faculty Advisor: Dr. Mark N. Goltz. Sponsor: N/A.
- BASTOW, LANDON B., *Modeling the Impact of the Payload Alert Communications System (PACS) on the Accuracy of Conjunction Analysis*. AFIT/ENV/13M-01. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: AFRL/RV. [CSRA]
- BLOMBERG, DANIEL L., *An Analysis of Cost Premiums and Losses Associated with USAF Military Construction (MILCON)*. AFIT/ENV/13M-02. Faculty Advisor: Col Paul Cotelleso. Sponsor: AFCEC.
- BOBSEIN, KLAYTON S., *Analysis of Effects of Organizational Behavior on Evolving System of Systems Acquisition Programs through Agent Based Modeling*. AFIT/ENV/13M-03. Faculty Advisor: Dr. John M. Colombi. Sponsor: OSD.
- BROST, GAVIN D., *Successfully Implementing Net-Zero Energy Policy through the Air Force Military Construction Program*. AFIT/ENV/13M-04. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: AFCEC.
- CARNEY, SHAUN T., *Investigation into Risk and Uncertainty: Identifying Coefficient of Variation Benchmarks for Air Force ACAT I Programs*. AFIT/ENV/13M-05. Faculty Advisor: Lt Col Jonathan D. Ritschel. Sponsor: AFLCMC.
- CRUMRINE, KEVIN T., *A Comparison of Earned Value Management and Earned Schedule as Schedule Predictors on DOD ACAT I Programs*. AFIT/ENV/13M-36. Faculty Advisor: Lt Col Jonathan D. Ritschel. Sponsor: CPM.
- CZABARANEK, JOSEPH A., *Pseudolite Architecture and Performance Analysis for the FAA's NextGen Airspace*. AFIT/ENV/13M-07. Faculty Advisor: Dr. David R. Jacques. Sponsor: FAA.
- GUSTAFSON, TREVOR A., *FIST and the Analytical Hierarchy Process: Comparative Modeling*. AFIT/ENV/13M-08. Faculty Advisor: Lt Col Joseph R. Wirthlin. Sponsor: SAF.
- HAGER, JOSHUA A., *An Analysis of Factors that Influence the Success of Expeditionary Civil Engineer Hub-and-Spoke Organizations*. AFIT/ENV/13M-09. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: PACAF.
- HARKER, JAMES W., *The Future of Mobile Information and Communication Technology in Austere Environments: A Command and Control Technology Integration Perspective*. AFIT/ENV/13M-10. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: 689 CCW.
- HUSCKO, ANDRE M., & SETO, JOSEPH N., *Applying Model Based System Engineering (MBSE) Methods to Perform Modeling and Simulation of Space Situational Awareness (SSA) Architectures*. AFIT/ENV/13J-01DL. Faculty Advisor: Dr. David R. Jacques. Sponsor: SMC.
- JANECZKO, ALLEN K., *Biodegradation of an Organophosphate Chemical Warfare Agent Simulant by Activated Sludge with Varying Solid Retention Times*. AFIT/ENV/13M-38. Faculty Advisor: Maj LeeAnn Racz. Sponsor: NHSRC.

KASPARI, LUKE M., *The Moderating Effect of Network Centrality on the Relationship between Work Experience Variables and Organizational Commitment*. AFIT/ENV/13M-11. Faculty Advisor: Dr. John J. Elshaw. Sponsor: N/A.

KELLER, BRANDON L., *Capturing Creative Program Management Best Practices*. AFIT/ENV/13M-12. Faculty Advisor: Lt Col Joseph R. Wirthlin. Sponsor: AFLCMC.

LEPIRE, KRISTA L., *Controlled Reception Pattern Antennas Testing with a Live-Sky Global Positioning System in an Anechoic Chamber*. AFIT/ENV/12D-03DL. Faculty Advisor: Dr. David R. Jacques. Sponsor: 746 TS.

MARSHALL, JOHN W., *An Evaluation of the Organizational Structure of Air Force Emergency Operations Centers Using Social Network Analysis and Design Structure Matrices*. AFIT/ENV/13M-13. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: AFMC/A7.

MAUNTEL, BRIAN R., *Cognitive Mentorship: Mediating Protégé Performance*. AFIT/ENV/13M-14. Faculty Advisor: Dr. John J. Elshaw, PhD. Sponsor: N/A.

MEIDINGER, TRAVIS J., *Influence of Media Size and Flow Rate on the Transport of Silver Nanoparticles in Saturated Porous Media: Laboratory Experiments and Modeling*. AFIT/ENV/13M-15. Faculty Advisor: Maj LeeAnn Racz. Sponsor: AFMSA.

MEIHAUS, JUSTIN C., *Understanding the Effects of Climate on Airfield Pavement Deterioration Rates*. AFIT/ENV/13M-16. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFCEC.

MILLER, CRYSTAL A., *Evaluation of an Adaptive Automation Trigger Based on Task Performance, Priority, and Frequency*. AFIT/ENV/13J-01. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

MURLEY, DAVID J., *Using Geographic Information Systems to Evaluate Energy Initiatives in Austere Environments*. AFIT/ENV/13M-17. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFCEC.

MUSSER, MORGAN L., *System Evolution with Technology; Analyzing Design Principles on the C-130*. AFIT/ENV/13S-04DL. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

MUTUNGA, DANIEL K., *Identifying System Patterns to Resolve Challenges in the Test and Evaluation Operation*. AFIT/ENG/ENV/13M-03DL. Faculty Advisor: Dr. John M. Colombi. Sponsor: AWTAP.

MYERS, ANDREW R., *Using Value-Focused Thinking as an Alternative Means of Opportunity Assessment for Strategic Sourcing Applications*. AFIT/ENV/13M-18. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFMC/771 ESS.

OKUR, CIHAN, *The Effect of Defense R&D on Military Capability and Technological Spillover*. AFIT/ENV/13M-20. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: N/A.

OVERMYER, JUSTIN M., *Process Reliability Modeling Evolved Expendable Launch Vehicle (EELV) Mission Assurance*. AFIT/ENV/13S-03DL. Faculty Advisor: Dr. John M. Colombi. Sponsor: SMC.

PAGE, JONNATHAN B., *Case Study Analysis of Trust and Commitment between the Civil Engineering Commodity Council and the Civil Engineering Career Field*. AFIT/ENV/13M-21. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFMC/771 ESS.

PARKER, CARISSA M., *Management Information Systems and the Age of Social Media: An Investigation of Social Network Research*. AFIT/ENV/13M-37. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: N/A.

PICKENPAUGH, JOSEPH G., *Assessment of Potential Carbon Dioxide-Based Demand Control Ventilation System Performance in Single Zone Systems*. AFIT/ENV/13M-22. Faculty Advisor: Col Paul Cotelleso. Sponsor: N/A.

PLEAKE-TAMM, PEETER E., *The Use of Multi-Criteria Evaluation and Network Analysis in the Area Development Planning Process*. AFIT/ENV/13M-23. Faculty Advisor: Lt Col Tay W. Johannes. Sponsor: N/A.

RUSSI, JASON G., *Effects of Stereoscopic 3D Digital Radar Displays on Air Traffic Controller Performance*. AFIT/ENV/13M-24. Faculty Advisor: Lt Col Brent T. Langhals. Sponsor: N/A.

RUSSI, SOFIA I., *Acquisitions Processes for Strategic Systems in the 21st Century*. AFIT/GSE/ENV/13M-05DL. Faculty Advisor: Lt Col Brent T. Langhals. Sponsor: AFNWC.

SANTANA, LAURIENNE C.R.A., *Supplementary Computer Generated Cueing to Enhance Air Traffic Controller Efficiency*. AFIT/ENV/13M-25. Faculty Advisor: Lt Col Brent T. Langhals. Sponsor: N/A.

SCHMIDT, MICHAEL A., *Health Risk Assessments of Waste Combustion Emissions Using Surrogate Analyte Models*. AFIT/ENV/13M-26. Faculty Advisor: Lt Col Dirk P. Yamamoto. Sponsor: AFMSA.

SETO, JOSEPH N., See HUSCKO, ANDRE M.

SHUCK, TIMOTHY J., *Development of Autonomous Optimal Cooperative Control in Relay Rover Configured Small Unmanned Aerial Systems*. AFIT/ENV/13M-27. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RQ.

SKIPLE, SCOTT A., *The Role of Customer Engagement in Innovation Adoption*. AFIT/ENV/12D-01. Faculty Advisor: Dr. Alfred E. Thal, Jr. Sponsor: AFRL/RQ.

SOINE, ANDREW T., *Needed Actions within Defense Acquisitions Based on a Forecast of Future Mobile Information and Communications Technologies Deployed in Austere Environments*. AFIT/ENV/13M-28. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: AFSPC.

SONGER, SCOTT A., *Aerial Networking for the Implementation of Cooperative Control on Small Unmanned Aerial Systems*. AFIT/ENV/13M-29. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFRL/RQ.

SPLAWN, JOSHUA M., *Applying Hyperspectral Imaging to Heart Rate Estimation for Adaptive Automation*. AFIT/ENV/13M-30. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

STORM, SARAH E., *Evaluating the Effect of Integrated System Health Management on Mission Effectiveness*. AFIT/ENV/13M-31. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RQ.

TEONG, KERWIN C., *Architecting Integrated System Health Management for Airworthiness*. AFIT/ENV/13S-01. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFRL/RQ.

URIBE, DAVID J., *An Investigation and Analysis of the Vestibulo-Ocular Reflex in a Vibration Environment*. AFIT/ENV/13M-32. Faculty Advisor: Dr. Michael E. Miller. Sponsor: 711 HPW/RH.

WALTERS, EDWARD B., *Fate of Malathion in an Activated Sludge Municipal Wastewater Treatment System*. AFIT/ENV/13M-33. Faculty Advisor: Maj LeeAnn Racz. Sponsor: NHSRC.

WELBORN, JONATHAN W., *Calibration and Extension of a Discrete Event Operations Simulation Modeling Multiple Un-Manned Aerial Vehicles Controlled by a Single Operator*. AFIT/ENV/13M-34. Faculty Advisor: Dr. John M. Colombi. Sponsor: AFRL/RQ.

5.6.2. GRADUATE RESEARCH PAPERS

AUGER, CHRISTOPHER M., BALDUS, LARS, & YOSHIMOTO, BRIAN K., *Modeling Space Launch Process Delays to Improve Space Vehicle Acquisition Timelines*. AFIT/ENV/GRP/13J-01. Faculty Advisor: Dr. John M. Colombi. Sponsor: NPS.

BALDUS, LARS, See AUGER, CHRISTOPHER M.

CONNER, ANDREW J., *Development of Military Flight Release Package, Test Safety Instruction and Initial Test Review Process at the Air Force Institute of Technology*. AFIT/ENV/GRP/13J-03. Faculty Advisor: Dr. David R. Jacques. Sponsor: AFLCMC.

MILLER, BRANDON L., *A Limited Evaluation of the Military Utility of Using Commercial Off the Shelf First Person Video Goggles to Acquire and Track a Human Sized Target*. AFIT/ENV/GRP/13J-04. Faculty Advisor: Dr. David R. Jacques. Sponsor: N/A.

PANTON, BRADLEY C., *Strengthening US DOD Cyber Security with the Vulnerability Market*. AFIT/ENV/GRP/13J-06. Faculty Advisor: Dr. John M. Colombi. Sponsor: N/A.

YOSHIMOTO, BRIAN K., See AUGER, CHRISTOPHER M.

5.6.3. FACULTY BIOGRAPHIES & RESEARCH OUTPUT

Notes: Research Center affiliation is listed in [] if applicable. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BADIRU, ADEDEJI B.,

Professor and Head, Department of Systems Engineering and Management, AFIT Appointment Date: 2006 (AFIT/ENV); BS, Tennessee Technological University, 1979; MS, Tennessee Technological University, 1981; PhD, Industrial Engineering, University of Central Florida, 1984. Dr. Badiru's research interests include Project Modeling, Analysis, Management, and Control, Mathematical Modeling, Computer Simulation, Information Systems, and Economic Analysis. He is the author of several books and technical journals. Tel. 937-255-3636 x4799 (DSN 785-3636 x4799), email: Adedeji.Badiru@afit.edu

REFEREED JOURNAL PUBLICATIONS

Badiru, A. B. and Marlin Thomas (2013): Quantification of the PICK Chart for Process Improvement Decisions, *Journal of Enterprise Transformation*, 3:1, 1-15, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Murley, D.J., A.E. Thal., Jr., L.J. Wyatt, T.W. Johannes, and A.B. Badiru, "Development of a Cooling Load Model for Geospatial Analysis of Energy Efficient Technology in Austere Environments," in Proceedings of 2013 Annual Conference of Industrial & Systems Engineering Research Conference, San Juan, Puerto Rico, May 18-23, 2013

Chun, W., P.P. Feng, A.E. Thal., Jr., and A.B. Badiru, "Life-Cycle Assessment of LEED vs. Conventionally Constructed Residential Units," in Proceedings of 2013 Annual Conference of Industrial & Systems Engineering Research Conference, San Juan, Puerto Rico, May 18-23, 2013.

BOOKS AND CHAPTERS IN BOOKS

Badiru, A. B. and S. O. Osisanya (2013), Project Management for the Oil & Gas Industry, Taylor & Francis CRC Press, Boca Raton, FL

Badiru, A. B. and LeeAnn Racz (2013), Handbook of Emergency Response: A Human Factors and Systems Engineering Approach, Taylor & Francis CRC Press, Boca Raton, FL

Agustiady, Tina and Badiru, A. B. (2013), *Sustainability: Utilizing Lean Six Sigma Techniques*, Taylor & Francis CRC Press, Boca Raton, FL

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Badiru, A. B., "Having a Ball with Science: Leveraging Sports to Spark Interest in STEM Subjects," Invited TechFest Workshop, Graham High School, St. Paris, OH, Apr 11, 2013.

Badiru, A. B., "Creating a Better World through STEM Education: The Crucial Roles of Underrepresented Groups," Invited Banquet Keynote, College of Science and Engineering, Central State University, Wilberforce, OH, Apr 9, 2013.

Badiru, A. B., "Having a Ball with Science: Leveraging Sports for Science Education," Workshop for K-12 Science Teachers, TechFest 2013, Dayton, OH, Feb 16, 2013.

Badiru, A. B., "14 Grand Challenges and 2020 Skills for Engineers," Panel Discussion Keynote, World Congress on Engineering Education (WCEE2013), Doha, Qatar, Jan 7-9, 2013.

Badiru, A. B., "How to be a Part of the future STEM Workforce Development: Don't Just Sit and Watch," Invited Keynote, Undergraduate Students STEM Research Symposium, Wilberforce University, 2012.

Badiru, A. B., “Social responsibility and educational advancement for the future generation,” Keynote Address, Saint Finbarr’s College – North America, Alumni Association Reunion, Atlanta, GA, 2012.

Badiru, A. B., “Preparing Resume, CV, and Cover Letter IIE Doctoral Colloquium,” Invited Lecture, Industrial & Systems Engineering Research Conference, May 19, 2012, Orlando, Florida.

Badiru, A. B., “Human Factors in Coordinated Emergency Response,” invited luncheon keynote speech, NNSA (National Nuclear Security Administration) workshop, Wilberforce University, 24 Mar 2012.

COLOMBI, JOHN M.,

Assistant Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT
Civilian Appointment Date: 2008 (AFIT/ENV); BSEE, University of Lowell, 1982; MSEE, Air Force Institute of Technology, 1992; PhD, Electrical Engineering, Air Force Institute of Technology, 1996. Dr. Colombi’s research interests within the growing discipline of Systems Engineering include: systems architecture, systems of systems analysis, complex adaptive systems and human systems integration. Tel. 937-255-3636 x3347, email: John.Colombi@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Enterprise Requirements and Acquisition Model (ERAM) Analysis and Extension.” Sponsor: NPS. Funding: \$50,000 – Colombi 50%, Wirthlin 50%.

“Multi-Level Socio-Technical Modeling (Enterprise and System of System Modeling).” Sponsor: OSD. Funding: \$5,000.

REFEREED JOURNAL PUBLICATIONS

Nicholas Hardman, David Jacques, John Colombi, Raymond Hill and Janet Miller, Requirements Elicitation through Legacy Mishap Analysis, American Institute of Aeronautics and Astronautics (AIAA) Journal of Aerospace Information Systems, Vol. 10, No. 3 (2013), pp. 105-113.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Danielle Worger, Eugene Rex Jalao, J. Robert Wirthlin, John Colombi, Teresa Wu, Effect of the Analysis of Alternatives on the DOD Acquisition System, Proceedings of the 2013 Industrial and Systems Engineering Research Conference, A. Krishnamurthy and W.K.V. Chan, eds. May 2013.

Danielle Worger, Eugene Rex Jalao, Christopher Auger, Lars Baldus, Brian Yoshimoto, J. Robert Wirthlin, John Colombi, Teresa Wu (Arizona State), Bottleneck Analysis for the DOD End-to-End Acquisition System, Proceedings of the 2013 Acquisition Research Symposium, <https://www.researchsymposium.com/>, May 2013.

Louis Pape, Kristin Giammarco, John Colombi, Cihan Dagli, Nil Kilicay-Ergin, George Rebovich, A fuzzy evaluation method for system of systems meta-architectures, Conference on Systems Engineering Research, Eds.: C.J.J. Paredis, C. Bishop, D. Bodner, Atlanta, GA, Mar 19-22, 2013.

Andrew R. Smith, John M. Colombi, Joseph R. Wirthlin, Rapid development: A content analysis comparison of literature and purposive sampling of rapid reaction projects, Conference on Systems Engineering Research, Eds.: C.J.J. Paredis, C. Bishop, D. Bodner, Atlanta, GA, Mar 19-22, 2013.

Debra Facktor Lepore (Stevens Institute of Technology), John Colombi, Jon Wade (Stevens Institute of Technology), Identification of Lanes of Acquisition from Military Rapid Development Programs, INCOSE Symposium, Jun 2013.

Debra Facktor Lepore, John M. Colombi, Jennifer Ford, Ryan Colburn, Yosef Morris, Observations on Expedited Systems Engineering Practices in Military Rapid Development Projects, Conference on Systems Engineering Research, Eds.: C.J.J. Paredis, C. Bishop, D. Bodner, Atlanta, GA, Mar 19-22, 2013.

Paulette Acheson, Nil Kilicay-Ergin, John Colombi, Cihan H. Dagli, Judith Dahmann, Understanding System of Systems Development Using an Agent-Based Wave Model, Complex Adaptive Systems Conference, Nov 2012, Washington DC.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Debra Lapore (Stevens) and John Colombi. A Framework for Expedited Systems Development, 15th Annual Systems Engineering Conference (National Defense Industrial Association), Oct 2012.

John Colombi, A Quantitative Analysis of the Benefits of Prototyping Fixed-Wing Aircraft, 15th Annual Systems Engineering Conference (National Defense Industrial Association), Oct 2012.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

INCOSE: Human Systems Integration Working Group, Complex Systems Working Group.

Invited by Georgia Tech on Technical Committee for Conf on SE Research 2013.

Technical Organizing Committee for Complex Adaptive Systems Conference Nov 2012 and Nov 2013.

Technical Committee for CSER 2013 at Georgia Tech, Atlanta.

Reviewer, IEEE Systems Man and Cybernetics (SMC).

ELSHAW, JOHN J.,

Assistant Professor of Management, Department of Systems Engineering and Management; BS, Accounting, University of Akron, 1991; MBA, Regis University, 1996, PhD, Krannert School of Management, Purdue University, 2010. Dr. Elshaw's research interests include organizational behavior, trust, leadership, human resource management, organizational causes of high-consequence errors, technology impact on individual and group behavior, social network analysis, cognition and emotions, organizational climate and culture, psychological influences on foreign audiences, cross-cultural leadership and communication, and hierarchical linear modeling. Tel. 937-255-3636 x4574 (DSN 785-3636 x4650), email: John.Elshaw@afit.edu

REFEREED JOURNAL PUBLICATIONS

Kirchner, A. T., Ladd, D. A., Elshaw, J. J., Schlub, J. F. An Inexpensive Workplace Initiative to Motivate High Risk Individual Health Improvement in the Workplace. Military Medicine, 178, 948-953.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AFIT Faculty Council Awards Committee Chairman.

Member AFRL Institutional Review Board (IRB).

GOLTZ, MARK N.,

Professor of Engineering and Environmental Management, Department of Systems Engineering and Management, AFIT Appointment Date: 1996 (AFIT/ENV); BS, Cornell University, 1972; MS, University of California, Berkeley, 1973; PhD, Environmental Engineering and Science, Stanford University, 1986. Dr. Goltz specializes in modeling the physical, chemical, and biological processes that affect the fate and transport of contaminants in the subsurface. He is also interested in the environmental fate and transport of nanomaterials, as well as the use of nanomaterials to remediate water contamination. Tel. 937-255-3636 x4638 (DSN 785-3636 x4638), email: Mark.Goltz@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Experimental Studies of Application of Peptide Nanotube Encapsulated Enzymes for Nerve Gas Detection.”
Sponsor: AFMSA. Funding: \$52,000 – Goltz 50%, Racz 50%.

REFEREED JOURNAL PUBLICATIONS

Flory, J., S.R. Kanel, L. Racz, C.A. Impellitteri, R.G. Silva, and M.N. Goltz, Influence of pH on the Transport of Silver Nanoparticles in Saturated Porous Media: Laboratory Experiments and Modeling, *Journal of Nanoparticle Research*, 15:1484, 2013.

Swarnakara, P., S.R. Kanel, D. Nepal, Y. Jiang, H. Jia, L. Kerr, M.N. Goltz, J. Levy, J. Rakovan, Silver Deposited Titanium Dioxide Thin Film for Photocatalysis of Organic Compounds Using Natural Light, *Solar Energy*, 88:242-249, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Williams, L.L., M.N. Goltz, and A. Agrawal, Transport behavior of nanoscale zerovalent iron stabilized with carboxymethylcellulose under simulated aquifer conditions, 246th American Chemical Society National Meeting & Exhibition, Indianapolis, IN, 8-12 Sep 2013.

Wang, B., F. Yu, M.N. Goltz, and A. Agrawal, Bench-scale degradation of emerging contaminants and recalcitrant organics by zerovalent magnesium and related bimetallic reductants, 246th American Chemical Society National Meeting & Exhibition, Indianapolis, IN, 8-12 Sep 2013.

Goltz, M.N. and J. Huang, Application of Temporal and Spatial Moments to Analyze Groundwater Contaminant Transport, 2013 World Environmental & Water Resources Congress, Cincinnati, OH, 19-23 May 2013.

Kanel, S.R., H. Choi, M.N. Goltz, Transport of surface-modified iron nanoparticle in porous media and application to arsenic remediation, 2013 World Environmental & Water Resources Congress, Cincinnati, OH, 19-23 May 2013.

Kanel, S.R., C. Han, A. Meyerhoefer, G. Crosson, D.D. Dionysiou, A. Agrawal, I. Pavel, P.H. Taylor, R. Striebig, C.A. Impellitteri, M.N. Goltz, Comparison of photo-degradation of 2,4-dinitrotoluene by silver doped and undoped titanium dioxide thin film in the presence of solar and uv light, 245th American Chemical Society National Meeting & Exhibition, New Orleans, LA, 7-11 Apr 2013.

Baker, P., M.N. Goltz, D.S. Kim, Development of a peptide nanotube- (PNT-) encapsulated enzyme biosensor to detect organophosphates in the gas phase, 2013 CBRN Symposium, Air Force Institute of Technology, Wright-Patterson AFB, OH, 2-4 Apr 2013.

Otero, M., D. Ayral, J. Shipan, M.N. Goltz, J. Huang, A.H. Demond, Cracking of Clay Due to Contact with Waste Chlorinated Solvents, American Geophysical Union Fall 2012 Meeting, San Francisco CA, 3-7 Dec 2012.

Ayral, D., M. Otero, S. Chung, M.N. Goltz, J. Huang, A.H. Demond, Enhanced Diffusion of Chlorinated Organic Compounds into Aquitards due to Cracking, American Geophysical Union Fall 2012 Meeting, San Francisco CA, 3-7 Dec 2012.

Sievers, K., M.N. Goltz, J. Huang, and A.H. Demond, Impact of DNAPL Storage in Cracked Low Permeability Layers on Dissolved Contaminant Plume Persistence, American Geophysical Union Fall 2012 Meeting, San Francisco CA, 3-7 Dec 2012.

Williams, L.L., M.N. Goltz, and A. Agrawal, Transport behavior and reactivity of nanoscale zerovalent iron stabilized with carboxymethylcellulose simulated under aquifer conditions in 1-D reactor, Geological Society of America Annual Meeting, Charlotte, NC, 4-7 Nov 2012.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Goltz, M.N., Issues with Nanotechnology for Groundwater Remediation, Panel: Nanotechnology: Applications and Implications, 2013 World Environmental & Water Resources Congress, Cincinnati, OH, 19-23 May 2013. Invited speaker.

National Engineers' Week Outreach Committee.

Tau Beta Pi OH Eta Chapter advisor.

American Academy of Environmental Engineers and Scientists Education Committee.

Society of American Military Engineers Kittyhawk Post Education Committee Chair.

Numerous peer reviews of manuscripts in multiple journals.

GRMAILA, MICHAEL R.,

Associate Professor and Assistant Head of Research, Department of Systems Engineering and Management, AFIT Appointment Date: 2004 (AFIT/ENV); BS, Texas A&M University, 1993; MS, Texas A&M University, 1995; PhD, Computer Engineering, Texas A&M University, 1999. Dr. Grimaila's research interests include modeling and simulation, mission assurance, network management and security, quantum cryptography, and systems engineering. He is a member of the ACM, a Senior Member of the IEEE, a Fellow of the ISSA, and serves as an advisor to the Price of Wales Fellows / Prince Edward Fellows at MIT and Harvard. Tel. 937-255-3636 x4800 (DSN 785-3636 x4800), email: Michael.Grimaila@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Communication Systems Security." Sponsor: LTS. Funding: \$115,000 – Grimaila 50%, Hodson 50%. [CCR]

REFEREED JOURNAL PUBLICATIONS

Bochert, J.R., Grimaila, M.R., and Kim, Y. "Software Protection Against Side Channel Analysis through a Hardware Level Power Difference Eliminating Mask," Journal of Cyber Security & Information Systems, Vol. 1, No. 3, pp. 22-29, May 2013.

Bryant, A.R., Mills, R.F., Grimaila, M.R., and Peterson, G L., "Top Level Goals in Reverse Engineering Software," Journal of Information Warfare. 12(1), pp. 32-43, Apr 2013.

Finke, C., Butts, J., Mills, R., Grimaila, M.R., "Enhancing the security of aircraft surveillance in the next generation air traffic control system," International Journal of Critical Infrastructure Protection, Vol. 6, Issue 1, pp. 3-11, ISSN 1874-5482, 10.1016/j.ijcip.2013.02.001, Mar 2013.

Sturtevant, M., Grimaila, M.R., and Sitzabee, W., "An Asset Management-Based Methodology for Integrating Guardrail Sensors Into an Existing Intelligent Transportation System," Public Works Management & Policy, Sage Press, DOI: 10.1177/1087724X12469508, (Published Online Before Print) Dec 26, 2012.

T. Dube, R. Raines, M.R. Grimaila, K. Bauer and S. Rogers, "Malware Target Recognition of Unknown Threats," IEEE Systems Journal, Vol. PP, Iss. 99, 2012, DOI 10.1109/JSYST.2012.2221913, (Published Online Before Print) Nov 30, 2012.

BOOKS AND CHAPTERS IN BOOKS

Beeker, K.R., Mills, R.F., Grimaila, M.R., and Haas, M.W., “Can an Operationally Responsive Cyberspace Play a Critical Role in the Strategic Deterrence Equation?,” *Deterrence: Rising Powers, Rogue Regimes, and Terrorism in the Twenty-First Century*, A.B. Lowther, ed., New York: Palgrave-MacMillan, Dec 2012, pp. 17-32.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AFIT Faculty Council President.

Editorial Advisory Committee of the Information System Security Association Journal.

Advisory Board Member of IBM’s Network Science Research Center (NSRC).

Advisor to the Prince of Wales / Prince Edward Fellows at MIT and Harvard.

Steering Committee Member of the World Congress in Computer Science, Computer Engineering, and Applied Computing (2012).

HAAS, MICHAEL W.,

Associate Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 2013 (AFIT/ENV); BS, Wright State University, 1977; MS, University of Utah, 1985; PhD, Engineering and Applied Science, University of Southampton, England, 1996. Dr. Haas’ research interests include human factors and human systems integration. He serves on numerous IEEE committees and is the founding chair of the Man & Cybernetics Society and Engineering in Medicine & Biology Society. Tel. 937-255-3636 x4645 (DSN 785-3636 x4645), email: Michael.Haas@afit.edu

REFEREED JOURNAL PUBLICATIONS

Haas, M.W., Hirshfield, L.M., Ponangi, P.V., Kidambi, P., Rao, D., Edala, N., Armbrust, E., Fendley, M., Narayanan, S. (May, 2013) Decision-making and emotions in the contested information environment. *EAI Endorsed Transactions on Security and Safety*, Vol. 13, Issue 1-6, e3, pp 1-6.

Ponangi, P., Kidambi, P., Rao, D., Edala, N., Fendley, M., Haas, M., Narayanan, S. (Dec, 2012) On the offense using cyber weapons to influence cognitive behavior. *International Journal of Cyber Society and Education*, Vol. 5, No. 2, pp 127-148.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Chair, IEEE Signal Processing Society Chapter, Dayton Section.

Co-chair, IEEE EBM-SMC Joint Chapter, Dayton Section.

Awards Chairman, Dayton Section of the IEEE.

HARPER, WILLIE F., Jr.,

Associate Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 2012 (AFIT/ENV); BS, Civil Engineering, University of California, Los Angeles, 1992; MENG, Environmental Engineering Cornell University, 1993; PhD, Environmental Engineering, University of California, Berkeley, 2002. Dr. Harper is interested in biotechnology for environmental applications related to water quality. Research topics include biotransformation of micro-contaminants, biosensing, microbial products, enzymatic processes, and environmental sustainability. Tel. 937-255-3636 x4528 (DSN 785-3636x4528), email: Willie.Harper@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Fast Detection and Quantification of Dangerous Water Pollutants with Biosensors.” Sponsor: AFMSA.
Funding: \$22,000 – Harper 90%, Racz 10%.

REFEREED JOURNAL PUBLICATIONS

Feng, Y., Barr, W., and W.F. Harper, Jr. (2013). Neural network processing of biosensor signals for the identification of chemicals present in water. *Journal of Environmental Management*, Vol. 120, 84-92.

Feng, Y., Kayode, O., and W.F. Harper, Jr. (2013). Integration of microbial fuel cell output metrics and nonlinear modeling techniques for smarter biosensing. *Science of the Total Environment*, Vol. 449, 223–228.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Racz, L., Harper, W.F., Miller, M., Grimaila, M., Magnuson, M., Willison, S., Tran, T., Duckworth, K., Spencer, M., Richwine, J., Ultraviolet Light Emitting Diode Use in Water Disinfection, Military Health Systems Research Symposium, Fort Lauderdale, FL, 12-15 Aug 2013.

W. F. Harper, Jr., William Barr, and Wenjing (Lisa) Cheng, Density-driven reactions underpin the oxidative coupling of 17 β -estradiol, 245th ACS National Meeting & Exposition, New Orleans, LA, Apr 7-11 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Water Environment Research Foundation Issue Area Team for Resource Recovery.

Proposal Reviewer for NSF/CBET.

Journal article reviewer for Environmental Science and Technology, Water Research, and Bioresource Technology.

W.F. Harper, Jr. “Biological Process Analysis and Modeling in Environmental Applications for Water Quality” Invited seminar speaker, Department of Civil, Environmental, and Geodetic Engineering, Ohio State University, Feb 4, 2013.

HEMINGER, ALAN R.,

Associate Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 1994 (AFIT/ENV); BA, Philosophy, University of Michigan, 1966; MS, Educational Psychology, California State University at Hayward, 1978; PhD, Management Information Systems, University of Arizona, 1988. Dr. Heminger’s research interests include information integration, strategic information management, computer supported group problem-solving, reengineering, and long-term access to information. Tel. 937-255-3636 x7405 (DSN 785-3636 x7405), email: Alan.Heminger@afit.edu

REFEREED JOURNAL PUBLICATIONS

Soine, A. T., J. W. Harker, A. R. Heminger, and J. H. Scherrer, “Deployed Comm in an Austere Environment: A Delphi Study,” *Air and Space Power Journal*, Sep, 2013.

Lynch, S. R., A. R. Heminger, and D. D. Mattioda, “Tanker Acquisition: A System Engineering Perspective,” *Air and Space Power Journal*, May-Jun 2013, pp 83-91.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Member AFRL Institutional Review Board (IRB).

JACQUES, DAVID R.,

Associate Professor of Aerospace Engineering, Department of Systems Engineering and Management, AFIT. Appointment Date: 1999 (AFIT/ENV); BS, Mechanical Engineering, Lehigh University, 1983; MS, Aeronautical Engineering, AFIT, 1989; PhD, Aeronautical Engineering, AFIT, 1995. Dr. Jacques' research interests include development planning, architecture based evaluation, multi-objective or constrained optimal design, and cooperative behavior and control of autonomous vehicles. Tel. 937-255-3636 x3329 (DSN 785-3636 x3329), email: David.Jacques@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

"Ilities Tradespace and Affordability Program (ITAP)." Sponsor: OSD. Funding: \$20,000.

"Ilities Tradespace and Analysis Program." Sponsor: OSD. Funding: \$30,000.

"Modular Systems for Rapid Integration of System-of-Systems Concepts." Sponsor: AFRL/RV. Funding: \$6,000.

REFEREED JOURNAL PUBLICATIONS

Ryan, E., Jacques, D., & Colombi, J. (2013). "An Ontological Framework for Clarifying Flexibility-Related Terminology via Literature Survey." *Systems Engineering*, 16(1): 99-110.

Ryan, E., Jacques, D., Ritschel, J., & Schubert, C. (2013). "Characterizing the Accuracy of DOD Operating and Support Cost Estimates." *Journal of Public Procurement*, 13(1): 103-132.

Ryan, E., Schubert-Kabban, C., Jacques, D. & Ritschel, J. (2013). "A Macro-Stochastic Model for Improving the Accuracy of Department of Defense Life Cycle Cost Estimates." *Journal of Cost Analysis and Parametrics*, 6(1): 43-74.

Nicholas Hardman, David Jacques, John Colombi, Raymond Hill and Janet Miller, Requirements Elicitation through Legacy Mishap Analysis, *American Institute of Aeronautics and Astronautics (AIAA) Journal of Aerospace Information Systems*, Vol. 10, No. 3 (2013), pp. 105-113.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Ryan, E., Jacques, D., Ritschel, J., & Colombi, J. (2013). "A Cost-Based Decision Tool for Valuing DOD System Design Options," *Procedia Computer Science* (Proceedings of 11th Annual Conference on Systems Engineering Research, Atlanta, GA), Vol. 16: 1180-1189.

BOOKS AND CHAPTERS IN BOOKS

Smith, D.E and D. Jacques, "A Practical, Simplified Chemical Agent Sensor Placement Methodology," To appear in *Handbook of Emergency Management: A Human Factors and Systems Engineering Approach*, Taylor and Francis, 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

AFIT EN Faculty Council President.

Program Chair for Graduate SE Programs.

Co-Chair of 1st AFRL-AFIT Research Colloquium.

JOHANNES, TAY W., Lt Col,

Assistant Professor of Engineering Management, Department of Systems Engineering and Management, AFIT Appointment Date: Mar 2010 (AFIT/ENV); BS, Electrical Engineering, Montana State University,

MT, 1990; MS, Engineering Management, Air Force Institute of Technology, Wright-Patterson AFB, OH, Mar 1999; PhD, Engineering Management, The George Washington University, DC, 2010. Lt Col Johannes' research interests include crisis and emergency management, organizational continuity, geographical information systems, and decision making. Tel. 937-255-3636 x3556 (DSN 785-3636 x3556), email: Tay.Johannes@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Murley, D.J., A.E. Thal., Jr., L.J. Wyatt, T.W. Johannes, and A.B. Badiru, "Development of a Cooling Load Model for Geospatial Analysis of Energy Efficient Technology in Austere Environments," *Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico, May 18-22, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Johannes, T., A Simple Guide on Public Works Preparedness for Terrorist Events, 2013 CBRN Symposium, Air Force Institute of Technology, Wright-Patterson AFB, OH, 2-4 Apr 2013.

BOOKS AND CHAPTERS IN BOOKS

Johannes, T. "Creating Effective Response Communications," *Handbook of Emergency Response: A Human Factors and Systems Engineering Approach*, Adedeji Badiru and LeeAnn Racz, Ed., CRC Press 2013, pp. 597-609.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Graduate Engineering Management Program Director for Air Force Civil Engineer career field.

Engineering management consultant for Department of Technical Applications, The Civil Engineer School, Air Force Institute of Technology.

Emergency Response Planning and Logistics Track Moderator, 2013 CBRN Symposium, Air Force Institute of Technology, Apr 2013.

LADD, DARIN A., Lt Col,

Director, Communications and Information and Assistant Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT Appointment Date: 2010 (AFIT/ENV); BS, Humanities, United States Air Force Academy, 1996; MS, Information Resource Management, Air Force Institute of Technology, 2002; PhD, Information Systems, Washington State University, 2010. Lt Col Ladd's research interests include Strategic Decision Support, Program Management, Mobile Computing, and Research Methods. Tel. 937-255-6565 x4228 (DSN 785-6565 x4228), email: Darin.Ladd@afit.edu

REFEREED JOURNAL PUBLICATIONS

Ladd, D.A., Datta, A., and Sarker, S., *Trying to Outrun a Speeding Environment: Developing "High-velocity" Strategic DSS Evaluation Criteria*, Journal of Information Technology Management, Vol. 24, Issue 2, 2013.

Kirchner, A., Ladd, D.A., Elshaw, J.J., and Schlub, J.C. *Effects of Cognitive-behavioral Motivation for Health Improvement on Anthropometric Measurements in High Risk Individuals*, Journal of Military Medicine, Vol. 178, Issue 8, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Ladd, D.A., Datta, A. *Defining a Fit-based Strategic DSS Evaluation Method*, Proceedings of the Midwest Association of Information Systems, May 2013.

Ladd, D.A., McNab, A. *Reframing Information Quality Construct Definition: A Contingency Approach*, Midwest Association of Information Systems Paper Jam Session, May 2013.

LANGHALS, BRENT T., Lt Col,

Assistant Professor of Engineering Systems, Department of Systems Engineering and Management. AFIT Appointment Date: 2011 (AFIT/ENV); BS, United States Air Force Academy, 1995; MS, Air Force Institute of Technology, 2001; PhD, University of Arizona, 2011. Lt Col Langhals' research interests include Human-Computer Interfaces, Systems Engineering, Vigilance, and Psychophysiological Cue Detection. Tel 937-255-3636 x4352 (DSN 785-3636 x4352), email: Brent.Langhals@afit.edu

REFEREED JOURNAL PUBLICATIONS

Langhals, B. T., Burgoon, J. K., Nunamaker, J.F. (2013). *Using Eye-based Psychophysiological Cues to Enhance Screener Vigilance*. Journal of Cognitive Engineering and Decision Making, Vol. 7, Issue 1, Mar, pp 83-95.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Russi, J.G., Langhals, B.T., Miller, M.E., Heft, E. (2013) *The Effects of Stereoscopic Radar Displays on Air Traffic Controller Performance*. Proceedings of the 17th International Symposium on Aviation Psychology, May, Dayton, OH.

Santana, L.C.R.A., Langhals, B.T., Miller, M.E., Finomore, V. (2013) *Does Supplementary Computer Generated Cueing Enhance Controller Efficiency in a Congested Communication Environment?* Proceedings of the 17th International Symposium on Aviation Psychology, May, Dayton, OH.

PATENTS

Jason Russi, Brent Langhals, and Mike Miller, "Stereoscopic 3-D Presentation for Air Traffic Control Digital Radar Displays" (AFD 1288). Provisional Application for Patent No. 61/768,573.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Planning Committee Member for Workshop on Innovation in Border Control (WIBC) 2013 as part of the European Intelligence and Security Informatics Conference.

Journal reviewer for IEEE Systems Journal and Psychophysiology.

MCMURRAY, GARTH P., Maj,

Instructor of Systems Engineering, Department of Systems Engineering and Management, AFIT Appointment Date: 2011 (AFIT/ENV); BS, Computer Engineering, Oregon State University, 1998; MS, Systems Engineering, Air Force Institute of Technology, 2005; PhD candidate, Cognitive Systems Engineering, The Ohio State University. Major McMurray is completing his doctoral dissertation related to improving airport surface management performance through departure metering. Tel. 937-255-3636 x7409 (DSN 785-3636 x7409), email: Garth.McMurray@afit.edu

MILLER, MICHAEL E.,

Assistant Professor of Systems Integration, Department of Systems Engineering and Management, AFIT Appointment Date: 2010 (AFIT/ENV); BS, Ohio University, 1987; MS, Ohio University, 1989; PhD, Industrial and Systems Engineering, Virginia Polytechnic Institute and State University, 1993. Dr. Miller's research interests include Human Systems Integration, Application of Human Vision to Display and Lighting Design and Systems Design for Light Emitting Diodes. Tel. 937-255-3636 x4651 (DSN 785-3636 x4651), email: Michael.Miller@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Communications Architecture of Distributed Ground Station.” Sponsor: 711 HPW/RH. Funding: \$9,000 – Miller 50%, Colombi 50%.

“Workload-Adaptive Human Interface to Aid Robust Decision Making.” Sponsor: AFOSR. Funding: \$28,360 – Miller 50%, Langhals 25%, Peterson 25%.

REFEREED JOURNAL PUBLICATIONS

Colombi, J.; Miller, M.E.; Schneider M.; McGrogan, J.; Long, D.S.; and Plaga, J. (2012). Predictive Mental Workload Modeling for Semi-Autonomous System Design: Implications for Systems of Systems, Journal of Systems Engineering, 15(4), pp. 448-460. [ANT]

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Parr, J.C., Miller, M.E., Bridges, N.R., Buhrman, C.E. Perry, N.L. Wright (2012). Evaluation of the Nij Neck Injury Criteria with Human Response Data for Use in Future Research on Helmet Mounted Display Mass Properties, Proceedings of the Human Factors and Ergonomics Society 56th Annual Meeting. Boston, MA.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Uribe, D., Miller, M.E., and Smith, S. (2013). An analysis of the vestibulo-ocular reflex during vibration, Proceedings of the International Symposium on Aviation Psychology, Dayton, OH, Vol. 4, pp. 506-511.

Santana, L.C.R.A., Langhals, B.T., Miller, M.E. and Finomore, V. (2013) Does supplementary computer generated cueing enhance controller efficiency in a congested communication environment?, Proceedings of the International Symposium on Aviation Psychology, Dayton, OH, Vol. 4, pp.226-231.

Russi, J.G., Langhals, B.T., Miller, M.E., Heft, E. (2013). The effects of stereoscopic radar displays on air traffic controller performance, Proceedings of the International Symposium on Aviation Psychology, Dayton, OH, Vol. 4, pp. 317-322.

PATENTS

Miller, M.E., Muszak, J.J., and Telek, M.J. Electronic device, display and touch-sensitive user interface, Dec. 2012, United States Patent 8,330,739.

Miller, M.E., Muszak, J.J., and Telek, M.J., Electronic device, display and touch-sensitive user interface, Nov 2012, United States Patent 8,310,462.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Conference Committee Member, Society for Information Display, Visual Performance Committee and Conference on Systems Engineering Research.

Reviewer for AFOSR and IEEE Systems Journal.

Stewarded the creation of an MOA with Navy Aeromedical Research Unit – Dayton.

RACZ, LEEANN, Maj,

Assistant Professor of Environmental Science and Engineering, Department of Systems Engineering and Management, AFIT Appointment Date: 2010 (AFIT/ENV); BS, Environmental Engineering, California Polytechnic State University, 1996; MS, Biological and Agricultural Engineering, University of Idaho, 2004; PhD, Civil and Environmental Engineering, University of Utah, 2010. Maj Racz specializes in wastewater treatment of pollutants of emerging concern, the fate of chemical warfare agents in the environment,

nitrifying mixed cultures, and environmental microbiology analyses. Tel. 937-255-3636 x4711 (DSN 785-3636 x4711), email: LeeAnn.Racz@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Light Emitting Diode (LED) Ultra-Violet (UV) Disinfection of Water.” Sponsor: NIOSH. Funding: \$7,000 – Racz 50%, Miller 50%.

“Ultraviolet (UV) Light Emitting Diode (LED) Use in Water Disinfection.” Sponsor: AFRL/RX. Funding: \$28,600.

“Ultraviolet (UV) Light Emitting Diode (LED) Use in Water Disinfection.” Sponsor: AFMSA. Funding: \$46,000 – Racz 34%, Miller 33%, Grimaila 33%.

“UV AOP for Water Treatment.” Sponsor: EPA. Funding: \$116,120 – Racz 34%, Miller 33%, Grimaila 33%.

REFEREED JOURNAL PUBLICATIONS

Flory, J., Kanel, S.R., Racz, L., Impellitteri, C.A., Rendahandi, G.S., and Goltz, M.N., Influence of pH on the transport of silver nanoparticles in saturated porous media: laboratory experiments and modeling, *Journal of Nanoparticle Research*, 15(3):2-11, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Racz, L., Harper, W.F., Miller, M., Grimaila, M., Magnuson, M., Willison, S., Tran, T., Duckworth, K., Spencer, M., Richwine, J., Ultraviolet Light Emitting Diode Use in Water Disinfection, Military Health Systems Research Symposium, Fort Lauderdale, FL, 12-15 Aug 2013.

Racz, L., Willison, S., Magnuson, M., Schuldt, S.J., Walters, E., Janeczko, A. Fate of chemical warfare agents in municipal wastewater treatment systems, 245th ACS National Meeting, New Orleans, LA, 7-11 Apr 2013.

Racz, L., Willison, S., Magnuson, M., Schuldt, S.J., Walters, E., Janeczko, A. Fate of organophosphorous chemical warfare agents in municipal wastewater treatment, 2013 CBRN Symposium, Air Force Institute of Technology, Wright-Patterson AFB, OH, 2-4 Apr 2013.

Duckworth, K., Tran, T., Spencer, M., Miller, M., Grimaila, M., Racz, L., UV LED Disinfection of Water, 2013 CBRN Symposium, Air Force Institute of Technology, Wright-Patterson AFB, OH, 2-4 Apr 2013.

Racz, L., Walters, E., Schuldt, S., Janeczko, A., Magnuson, M., Willison, S. Fate of chemical warfare agents in wastewater treatment biomass (Poster), CBRNe Convergence 2012, Norfolk, VA, 30 Oct-2 Nov 2012. Won “Best Poster” Award.

BOOKS AND CHAPTERS IN BOOKS

Badiru, A. B. and LeeAnn Racz (2013), Handbook of Emergency Response: A Human Factors and Systems Engineering Approach, Taylor & Francis CRC Press, Boca Raton, FL.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Colloquium Organizer, 12th Annual IIE Doctoral Colloquium, San Juan, Puerto Rico, May 2013.

Conference Organizer, 2013 CBRN Symposium, Air Force Institute of Technology, Apr 2013.

Reviewer for Water Research.

Proposal reviewer for U of Cincinnati Pilot Research Program (PRP).

Non-Affiliated Representative to the WPAFB Institutional Animal Care and Use Committee (IACUC).

RITSCHEL, JONATHAN D., Lt Col,

Assistant Professor of Cost Analysis, Department of Systems Engineering and Management, AFIT
Appointment Date: 2011 (AFIT/ENV); BBA, Accountancy, University of Notre Dame, 1997; MS, Cost Analysis, Air Force Institute of Technology, Wright-Patterson AFB, OH, 2003; PhD, Economics, George Mason University, VA, 2011. Lt Col Ritschel's research interests include public choice, the effects of acquisition reforms on cost growth in DOD weapon systems, research and development cost estimation, and economic institutional analysis. Tel. 937-255-3636 x4441 (DSN 785-3636 x4441), email: Jonathan.Ritschel@afit.edu

REFEREED JOURNAL PUBLICATIONS

Ritschel, J.D. (2012) "Efficacy of U.S. Legislation in Military Acquisition Programs: Nunn-McCurdy Act Unveiled," *Economic Papers: A Journal of Applied Economics and Policy*, 31: 491-500.

Ryan, E.T., Schubert, C.M., Jacques, D.R., and Ritschel, J.D. (2013) "A Macro-Stochastic Model for Improving the Accuracy of Life Cycle Cost Estimates," *Journal of Cost Analysis and Parametrics*, 6: 43-74.

Ryan, E.T., Jacques, D.R., Ritschel, J.D. and Schubert, C.M. (2013). "Characterizing the Accuracy of DOD Operating and Support Cost Estimates," *Journal of Public Procurement*, 13 (1), 103-132.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Crumrine, K.T. and Ritschel, J.D. "Earned Schedule: Utility in Major U.S. Air Force Acquisition Programs," 29th annual EVM World Conference, Naples FL, 29-31 May 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Director, joint AFIT-NPS MCEA DL Program.

Associate Editor, *Journal of Cost Analysis and Parametrics*.

Reviewer: *IEEE Systems Journal*, *Defense Acquisition Review Journal*.

RUSNOCK, CHRISTINA, F., Capt,

Assistant Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT
Appointment Date: 2013 (AFIT/ENV); BA, Economics-Government, Claremont McKenna College, 2004; MS, Research and Development Management, Air Force Institute of Technology, 2008; MS, Industrial Engineering-Systems Engineering, University of Central Florida, 2011; PhD, Industrial Engineering-Human Factors, University of Central Florida, 2013. Capt Rusnock's research interests include cognitive workload modeling, human performance modeling, human-systems integration, and discrete event simulation. Tel. 937-255-3636 x4611 (DSN 785-3636 x4611), email: Christina.Rusnock@afit.edu

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Rusnock, C.F. (2013) Is Computer Simulation Modeling of Cognitive Workload as Effective as Traditional Subjective and Physiological Methods?" *Air Force Research Labs – Air Force Institute of Technology Colloquium on Human Machine Systems*, Wright-Patterson AFB, OH, 24 Sept, 2013.

RYAN, ERIN, T., Maj,

Assistant Professor of Systems Engineering, Department of Systems Engineering and Management, AFIT
Appointment Date: 2012 (AFIT/ENV); BS, University of Washington, 1998; MA, New Mexico State

University, 2008; PhD, Systems Engineering, Air Force Institute of Technology, 2012. Maj Ryan's research interests include cost estimating methodologies and cost-based decision tools for valuing system design options.. Tel. 937-255-3636 x3348 (DSN 785-3636 x3348), email: Erin.Ryan@afit.edu

REFEREED JOURNAL PUBLICATIONS

Ryan, E., Jacques, D., & Colombi, J. (2013). "An Ontological Framework for Clarifying Flexibility-Related Terminology via Literature Survey." *Systems Engineering*, 16(1): 99-110.

Ryan, E., Jacques, D., Ritschel, J., & Schubert, C. (2013). "Characterizing the Accuracy of DOD Operating and Support Cost Estimates." *Journal of Public Procurement*, 13(1): 103-132.

Ryan, E., Schubert-Kabban, C., Jacques, D. & Ritschel, J. (2013). "A Macro-Stochastic Model for Improving the Accuracy of Department of Defense Life Cycle Cost Estimates." *Journal of Cost Analysis and Parametrics*, 6(1): 43-74.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Ryan, E., Jacques, D., Ritschel, J., & Colombi, J. (2013). "A Cost-Based Decision Tool for Valuing DOD System Design Options," *Procedia Computer Science* (Proceedings of 11th Annual Conference on Systems Engineering Research, Atlanta, GA), Vol. 16: 1180-1189.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Commandant's Reading Colloquium: One of 3 faculty members participating in Commandant's colloquium focused on shared reading and discussion of relevant military/leadership/academic topics.

SHELLEY, MICHAEL L.,

Professor of Environmental Science and Engineering, Department of Systems Engineering and Management, AFIT Appointment Date: 1996 (AFIT/ENV); BCE (Civil Engineering), Auburn University, 1974; MS (Environmental Engineering), Virginia Tech, 1975; PhD, Environmental Science and Engineering, University of North Carolina, 1985. Dr. Shelley focuses on system dynamics modeling in analyzing long-term management strategies. His research interests include abiotic and biochemical contaminant fate and transport, physiologically-based pharmacokinetic modeling, and ecological engineering design to optimize mission activity with environmental constraints. Tel. 937-255-3636 x7387 (DSN 785-3636 x7387), email: Michael.Shelley@afit.edu

BOOKS AND CHAPTERS IN BOOKS

Seaman, G.G., Shelley, M.L., Gearhart, J.M., and Smith, D.A., "Dynamics and dangers of therapeutic strategies for organophosphate poisoning: A physiologically based model," *Handbook of Emergency Response: A Human Factors and Systems Engineering Approach*, Adedeji Badiru and LeeAnn Racz, Ed., CRC Press, 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Reviewer NSF Proposals.

Chair, Dept Doctoral Committee.

THAL, ALFRED E., Jr.,

Assistant Professor of Engineering Management, Department of Systems Engineering and Management, AFIT Appointment Date: 1998 (AFIT/ENV); BS, Civil Engineering, Texas Tech University, 1981; MS, Engineering Management, AFIT, 1985; PhD, Environmental Engineering, University of Oklahoma, 1999. Dr. Thal's research interests include engineering and environmental management, groundwater flow and

remediation technologies, facility and infrastructure management, product development, sustainability and project management. Tel. 937-255-3636 x7401 (DSN 785-3636 x7401), email: Alfred.Thal@afit.edu

REFEREED JOURNAL PUBLICATIONS

Lee, S.M., A.E. Thal, Jr., E.J. Unger, and E.D. White III, "Daylighting Strategies: Life-Cycle Cost Modeling and Policy Implications for Emerging Technology," *Engineering Management Journal*, 24(4):3-17, Dec 2012.

Nyikos, D.M., A.E. Thal, Jr., M.J. Hicks, and S.E. Leach, "To LEED or not to LEED: Analysis of Cost Premiums Associated with Sustainable Facility Design," *Engineering Management Journal*, 24(4), 50-62, Dec 2012.

Romero, M.A., A.E. Thal, Jr., and S. Ekwaro-Osire, "Understanding Barriers to Technology Transfer in a Federal Laboratory," *European Journal of Business and Research*, 12(4):127-132, Dec 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Chun, W., P.P. Feng, A.E. Thal, Jr., and A.B. Badiru, "Life-Cycle Assessment of LEED vs. Conventionally Constructed Residential Units," Industrial and System Engineering Research Conference, San Juan, Puerto Rico, May 18-22, 2013.

Murley, D.J., A.E. Thal, Jr., L.J. Wyatt, T.W. Johannes, and A.B. Badiru, "Development of a Cooling Load Model for Geospatial Analysis of Energy Efficient Technology in Austere Environments," Industrial and Systems Engineering Research Conference, San Juan, Puerto Rico, May 18-22, 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Chair: Academic Standards Committee, GEM Curriculum Committee, Dept P&T Committee.

Member/reviewer, PICMET Program Committee.

Reviewer: Industrial and Systems Engineering Research Conference, *IEEE Systems Journal*, *Journal of Construction Engineering and Management*.

WIRTHLIN, JOSEPH R., Lt Col,

Associate Head, Strategic Communications, Department of Systems Engineering and Management, AFIT
Appointment Date: 2009 (AFIT/ENV); BS, The United States Air Force Academy, 1994; MS, Massachusetts Institute of Technology, 2000; PhD, Engineering Systems, Massachusetts Institute of Technology, 2009. Lt Col Wirthlin's research interests include Product Development (New, Rapid, Complex Systems, Lean Product Development), Acquisition (DOD, US Air Force), Modeling and Simulation, Risk and Risk Management, Systems Engineering, Requirements, Project/Program Management, Management of Engineering, and Lean Thinking. Tel: 937-255-3636 x4650 (DSN 785-3636 x4650), email: Joseph.Wirthlin@afit.edu

REFEREED JOURNAL PUBLICATIONS

Keller, B.L., Wirthlin, J.R. (2012) Assessing the Scope and Applicability of FIST Principles, *Defense Acquisition Review Journal*, Jul 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Worger, D., Jalao, E., Wu, T., Wirthlin, J., Colombi, J. (2013) Effect of the Analysis of Alternatives on the DOD Acquisition System, *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, A. Krishnamurthy and W.K.V. Chan, eds., San Juan, Puerto Rico, May 18-22, 2013.

Marshall, J.W., Johannes, T.W., Wirthlin, J.R. (2013) A Scenario Based Evaluation of the Organizational Structure of Air Force Emergency Operations Centers Using Design Structure Matrices, *Proceedings of the 42nd Western Decision Sciences Institute Meeting, Long Beach, CA, Mar 26-29, 2013*.

O'Connell, P., Wirthlin, J., Malas, J., Soni, S. (2013) Application of Systems Engineering to Small Business Innovative Research (SBIR), *Procedia Computer Science*, Vol. 16, 2013, Pages 621-630, ISSN 1877-0509, 10.1016/j.procs.2013.01.065 (*Proceedings of the 2013 Conference on Systems Engineering Research, Atlanta, GA, Mar 19-22, 2013*).

Smith, A., Wirthlin, J., Colombi, J. (2013) Rapid Development: A Content Analysis Comparison of Literature and Purposive Sampling of Rapid Reaction Projects, *Procedia Computer Science*, Vol. 16, 2013, Pages 475-482, ISSN 1877-0509, 10.1016/j.procs.2013.01.050 (*Proceedings of the 2013 Conference on Systems Engineering Research, Atlanta, GA, Mar 19-22, 2013*).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Worger, D., Jalao, E.R., Auger, C., Baldus, L., Yoshimoto, B., Wirthlin, J.R., Colombi, J., Wu, T., (2013) Bottleneck Analysis on the DOD Pre-Milestone B Acquisition Process, *Proceedings of the 10th Annual Acquisition Research Symposium, Naval Postgraduate School, Monterey, CA, May 2013*.

Keller, B., Wirthlin, J. (2013) Capturing Creative Program Management Best Practices, *Proceedings of the 10th Annual Acquisition Research Symposium, Naval Postgraduate School, Monterey, CA, May 2013*.

Soni, S.R., Al-Romaihi, M., Wirthlin, J.R., Badiru, A.B., Weir, J.D. (2012) Analysis of Z-Pinned Laminated Composites Fatigue Test Data, *Proceedings of the International Conference on Agile Manufacturing-2012, Uttar Pradesh, India, Dec 16-19, 2012*.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

GRD (Research & Development Management Degree) Program Director.

Program Committee member for the 2013 Conference on Systems Engineering Research, Atlanta, Georgia, Mar 19-22, 2013.

Corporate Advisory Board, International Council on Systems Engineering, on behalf of The US Air Force Center for Systems Engineering.

Editorial Board: Defense Acquisition Review Journal, IEEE Systems Journal, Journal of Enterprise Transformation.

YAMAMOTO, DIRK P., Lt Col,

Assistant Professor, Department of Systems Engineering and Management, AFIT Appointment Date: 2010 (AFIT/ENV); BS, Electrical Engineering, University of Minnesota, MN 1992; MS, Engineering Systems Management, St Mary's University, TX 1995; MS, Public Health (Industrial Hygiene emphasis), University of Utah, UT 2003; PhD, Systems Engineering, Air Force Institute of Technology, OH, 2010. Lt Col Yamamoto's research interests include deployed military waste/burn pit emissions and pharmacokinetic modeling of nanoparticle exposures. Other research interests include bioaerosol sampling, advanced composite material exposure assessment, and geospatial/plume dispersion modeling. Tel: 937-255-3636 x4511 (DSN 785-3636 x4511), email: Dirk.Yamamoto@afit.edu

SPONSOR FUNDED RESEARCH PROJECTS

“Air Emissions Characterization from Open Burning and Incineration of Military Waste in Afghanistan.” Sponsor: AFMSA. Funding: \$32,000.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Enderby, J., D. Yamamoto, J. Pignatiello, J. Black. Comparison of Two Biological Warfare Air Samplers Using Live Surrogate Agents. CBRNE Convergence 2012, Oct 2012. (Poster).

Yamamoto, D. Emissions from Waste Combustion Processes in the Deployed Military Environment. 2013 Air Force Research Laboratory Waste-to-Energy Workshop, Wright-Patterson AFB, OH, 7 May 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

Director, Graduate Industrial Hygiene Program.

American Industrial Hygiene Association (AIHA) Vice-Chair/Chair-Elect 2013-2014, Continuing Education Committee.

ABET Applied Science Accreditation Commission (ASAC) Program Evaluator (PEV).

Reviewer for Atmospheric Environment.

Proposal reviewer for U of Cincinnati Pilot Research Program (PRP).

Non-Affiliated Representative to the WPAFB Institutional Animal Care and Use Committee (IACUC).

6. RESEARCH CENTER PUBLICATIONS AND FUNDING INFORMATION

The contents of this section are duplicated data, grouped by center. The information is previously listed within each project's specific academic department.

6.1. ADVANCED NAVIGATION TECHNOLOGY CENTER

Advanced Navigation Technology (ANT) Center

Director 255-3636 x4580
Executive Administrator 255-3636 x4583
Laboratory Manager 255-3636 x4911
Homepage: <http://www.afit.edu/en/ANT>

6.1.1. DOCTORAL DISSERTATIONS

HAKER, MARSHALL E., *Modeling the Effects of the Local Environment on a Received GNSS Signal*. AFIT/DEE/ENG/12-11. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RV.

KAUFFMAN, KYLE J., *Radar Based Navigation in Unknown Terrain*. AFIT/ENG/DS/12-03. Faculty Advisor: Dr. John F. Raquet. Sponsor: DAGSI.

KING, AMANDA S., *Development of a Model and Localization Algorithm for Received Signal Strength-Based Geolocation*. AFIT/ENG/DS/13J-02. Faculty Advisor: Dr. Richard K. Martin. Sponsor: N/A.

6.1.2. MASTER'S THESES

DEAN, JAMES W., *Real-time Heading Estimation using Perspective Features*. AFIT/ENG/13M-13. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RW.

EMGE, JAMES E., *Cognitive Augmentation for Network Defense*. AFIT/ENG/13M-16. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RI.

HANNAN, JAMES C., *Mobile Network Defense Interface for Cyber Defense and Situational Awareness*. AFIT/ENG/13M-21. Faculty Advisor: Maj Kennard R. Laviers. Sponsor: AFRL/RI.

HARDIN, JOSHUA A., *Information Encoding on a Pseudo Random Noise Radar Waveform*. AFIT/ENG/13M-22. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RW.

KUHAR, BENJAMIN J., *RF Emitter Tracking and Intent Assessment*. AFIT/ENG/13M-29. Faculty Advisor: Dr. Richard K. Martin. Sponsor: AFRL/RV.

LINGG, HEATHER A., *Dynamic Network Topologies*. AFIT/ENG/13J-04. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFOSR.

LORENZINI, PHILIP E., *Sensitivity Analysis of an Automated Calibration Routine for Airborne Cameras*. AFIT/ENG/13M-51. Faculty Advisor: Dr. John F. Raquet. Sponsor: AFRL/RV.

MARIETTA, DANIEL A., *Error Characterization of Vision-Aided Navigation Systems*. AFIT/ENG/13M-33. Faculty Advisor: Lt Col Kenneth A. Fisher. Sponsor: AFRL/RV.

MYERS, AARON T., *The Miniaturization of the AFIT Random Noise Radar*. AFIT/ENG/13M-37. Faculty Advisor: Dr. Peter J. Collins. Sponsor: N/A.

QUARMYNE, JAMES O., *Inertial Navigation System Aiding Using Vision*. AFIT/ENG/13M-40. Faculty Advisor: Dr. Meir Pachter. Sponsor: AFRL/RW.

RAULERSON, EVAN L., *Modeling Cyber Situational Awareness through Data Fusion*. AFIT/ENG/13M-41. Faculty Advisor: Dr. Kenneth M. Hopkinson. Sponsor: AFRL/RI.

VRANICAR, TREVOR J., *Airborne Network Data Availability Using Peer to Peer Database Replication on a Distributed Hash Table*. AFIT/ENG/13M-48. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RV.

WELLER-FAHY, DAVID J., *Network Intrusion Dataset Assessment*. AFIT/ENG/13M-49. Faculty Advisor: Dr. Brett J. Borghetti. Sponsor: 711 HPW/RH.

WILSON, RUSSELL D., IV, *Adaptations and Analysis of the AFIT Noise Radar Network for Indoor Navigation*. AFIT/ENG/13M-50. Faculty Advisor: Dr. Peter J. Collins. Sponsor: AFRL/RW.

6.1.3. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BLACK, JONATHAN T., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

“Characterizing MAV Wings in Flight.” Sponsor: AFOSR. Funding: \$31,500.

COBB, RICHARD G., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

“Automatic Airborne Collision Avoidance System for Remotely Piloted Aircraft (RPA).” Sponsor: AFRL/RQ. Funding: \$13,000.

“Automatic Ground Collision Avoidance System Trajectory Optimization.” Sponsor: AFRL/RQ. Funding: \$12,000.

“Development of Autonomous Small UAS for Search and Delivery Missions.” Sponsor: AFRL/RW. Funding: \$54,000 – Cobb 25%, Reeder 25%, Jacques 25%, Colombi 25%.

“Collaborative Control for Multi-UAV Operations.” Sponsor: AFRL/RQ. Funding: \$20,000 – Cobb 25%, Jacques 25%, Colombi 25%, Pachter 25%.

COLLINS, PETER J., Department of Electrical and Computer Engineering

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

T. Thorson, G. Akers, and P. Collins, “Modeling the AFIT Random Noise Radar,” *Proceedings of the Radar 2012 International Conference on Radar Systems*, Glasgow, UK, Oct 22-25, 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

R. Wilson and P. Collins, “AFIT Noise Radar Network for Indoor Navigation,” *ION COUNT 7th Annual Informational Meeting*, Columbus OH, 9-10 Apr 2013.

B. Acerson, J. Hardin, R. Wilson, and P. Collins, “Noise Radar Measurements,” *14th RCS Measurement Facilities Certification Conference*, Broomfield, CO, 2012.

FISHER, KENNETH A., Lt Col, Department of Electrical and Computer Engineering

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Marietta, D., K. Fisher, and C. Taylor, “Error Characterization of Extended Kalman Filter Based Image-Aided Navigation,” 2013 International Technical Meeting of the ION, San Diego, CA, Jan 2013.

Marietta, D., K. Fisher, and C. Taylor, "Error Characterization of Extended Kalman Filter Based Image-Aided Navigation," 2012 Dayton Engineering and Science Symposium, Dayton, Ohio, Oct 2012.

HODSON, DOUGLAS D., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Support of AFNES/RIPR Autonomy Effort." Sponsor: AFRL/RQ. Funding: \$30,000 – Hodson 50%, Peterson 50%.

JENNINGS, ALAN L., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

"Cloud-Induced Uncertainty for Visual Navigation." Sponsor: DAGSI. Funding: \$43,498.

KAUFFMAN, KYLE J., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Hybrid Sensor Fusion for Autonomous Applications." Sponsor: AFOSR. Funding: \$20,766 – Kauffman 75%, Pachter 25%.

"UAV Vision-Aided Navigation (UVAN) Demo." Sponsor: AFRL/RQ. Funding: \$285,900 – Kauffman 50%, Raquet 30%, Haker 10%, Woolley 10%.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

K. Kauffman, J. Raquet, Y. Morton, D. Garmatyuk, "Experimental Study of Two-channel UWB-OFDM Radar for Indoor Navigation with INS Integration," *Proc. ION GNSS*, Nashville, TN, Sept 2013.

Kauffman, K and J. Raquet, "Self-Building World Model for Magnetometer-based Navigation Using a Distributed Sensor Network," *Proceedings of ION GNSS+-2013*, Nashville, TN, 2013.

Kauffman, K., J. Raquet, Y. Morton, and D. Garmatyuk, "Experimental Study of Two-channel UWBOFDM Radar for Indoor Navigation with INS Integration," *Proceedings of ION GNSS+-2013*, Nashville, TN, 2013.

BOOKS AND CHAPTERS IN BOOKS

Garmatyuk, D., K. Kauffman, J. Raquet, Y. Morton, "Multifunctional Software-Defined Radio Sensors for Detection, Imaging, and Navigation," *Low Power Emerging Wireless Technologies*, ed. R. Mahmoudi and K. Iniewski, CRC Press, pp. 99-115, Feb 2013.

MARTIN, RICHARD K., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Distributed TDOA-Based Source Localization." Sponsor: AFOSR. Funding: \$23,350 – Martin, R. 50%, Fisher 50%.

"Joint SIGINT-IMINT Position Tracking." Sponsor: AS&T. Funding: \$46,896 – Martin, R. 80%, Sambora 20%.

REFEREED JOURNAL PUBLICATIONS

R. K. Martin, A. S. King, J. Pennington, R. W. Thomas, R. Lenahan, and C. Lawyer, "Modeling and Mitigating Noise and Nuisance Parameters in Received Signal Strength Positioning," *IEEE Transactions on Signal Processing*, Vol. 60, No. 10, Oct 2012, pp. 5451-5463.

PACHTER, MEIR, Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Autonomous Control and Navigation." Sponsor: AFRL/RW. Funding: \$45,000.

"Decision Support Techniques." Sponsor: AFRL/RV. Funding: \$10,000.

"Games, Information and Deception Exploitation for Adversarial Network Systems." Sponsor: AFOSR. Funding: \$37,720.

REFEREED JOURNAL PUBLICATIONS

M. Park, K. Krishnamoorthy, M. Pachter, S. Dharba and P. Chandler: "State Partitioning Based Linear Program for Stochastic Dynamic Programs – An Invariance Property," *Operations Research Letters*, Vol. 40, No. 6, Nov 2012, pp. 487-491.

K. J. Ross, K. M. Hopkinson and M. Pachter: "Using a Distributed Agent – Based Communication – Enabled Special Protection System to Enhance Smart Grid Security," *IEEE Trans. On Smart Grid*, Vol. 4, No. 2, Jun 2013, pp.1216-1224.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

K. Kalayanam, M. Pachter and P. Chandler: "A Lower Bounding Linear Programming Approach to the Perimeter Patrol Stochastic Control Problem," *AIAA Infotech Aerospace 2012*, 2012, Garden Grove, CA, AIAA Paper 2012- 2454.

M. Pachter and A. Relyea: "A Covariance Analysis of Vision – Aided Inertial Navigation – 3D Free Fall Case," *I. Y. Bar-Itzhack Memorial Symposium on Estimation, Navigation and Spacecraft Control*, Haifa, Israel, Oct 14-17, 2012, pp. 568 - 587.

K. Kalayanam, S. Dharba, M. Pachter and P. Chandler: "Sub-Optimal Stationary Policies for a Class of Stochastic Optimization Problems Arising in Robotic Surveillance Applications," *ASME 5th Annual Systems and Control Conference/DSCC/MOVIC 2012*, Oct. 17 – 19, 2012, Ft. Lauderdale, FL, Paper No. 8610. Semi-Plenary Presentation.

K. Kalayanam, S. Dharba, M. Pachter and P. Chandler: "UAV Search & Capture of a Moving Ground Target Under Delayed Information," *51th IEEE Conference on Decision and Control*, Dec 10 – 13, Maui, Hawaii, pp. 3092-3097.

M. Pachter, T. Welker, R. Huffman: "Covariance Analysis of a Gyro-Free INS," *53rd Israel Annual Conference on Aerospace Sciences*, Mar 6-7, 2013, Tel Aviv, Israel.

T. Welker, R. Huffman, M. Pachter: "Modeling Earth's Gravitational Gradients for GPS – Free Navigation," Paper MoC01.4, *American Control Conference*, Jun 16-19, 2013, Washington, DC.

K. Kalayanam, S. Dharba, P. Khargonekar, D. Casbeer, P. Chandler and , M. Pachter: "Optimal Minimax Pursuit-Evasion on a Manhattan Grid," Paper TuB 11.6, *American Control Conference*, Jun 16-19, 2013, Washington, DC.

BOOKS AND CHAPTERS IN BOOKS

- M. Pachter and K. Pham “Information Patterns in Discrete-Time Linear-Quadratic Dynamic Games,” in *Sensors: Theory, Algorithms and Applications*, V. Boginski, C. Commander, P. M. Pardalos and Y. Ye, Eds., pp. 83-115, Springer, 2012.
- M. Pachter and K. Pham: “The Role of Information in Nonzero-Sum Differential Games,” in *Dynamics of Information Systems: Mathematical Foundations*, A. Sorokin, R. Murphey, M. Thai and P. M. Pardalos, Eds., pp. 281-303, Springer 2012.
- K. Pham and M. Pachter: “Information Considerations in Multi-Person Cooperative Control/Decision Problems Information Sets, Sufficient Information Flows and Risk Averse Decision Rules for Performance Robustness,” in *Dynamics of Information Systems: Mathematical Foundations*, A. Sorokin, R. Murphey, M. Thai and P. M. Pardalos, Eds., pp. 297-318, Springer 2012.
- K. Pham and M. Pachter: “Modeling Interactions in Complex Systems – Self Coordination, Game Theoretic Design Protocols and Performance Reliability Aided Decision Making,” in *Dynamics of Information Systems: Mathematical Foundations*, A. Sorokin, R. Murphey, M. Thai and P. M. Pardalos, Eds., pp. 319-361, Springer 2012.
- K. Krishnamoorthy, M. Pachter, S. Dharba and P. Chandler: “Approximate Dynamic Programming Applied to UAV Perimeter Patrol,” *Recent Advances in Research on UAVs, Lecture notes in Control and Information Sciences Vol. 444*, pp. 119-146, Springer Verlag, Berlin, 2013, F. Fahroo, L. Y. Wang and G. Yin, Eds.

PETERSON, GILBERT L., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“Maximization of Observability in Navigation for Autonomous Robotic Control (MONARC).” Sponsor: AFRL/RV. Funding: \$75,000 – Peterson 80%, Raquet 20%.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS ON ABSTRACT REVIEW

Eng, K.G., Peterson, G.L., Kresge, J.T., and Campbell, J.L., “Intelligent Behavioral Action Aiding for Improved Image Navigation,” *Proceedings of the 25th International Technical Interchange Meeting*, San Diego, CA, pp. 771-779.

RAQUET, JOHN F., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“ANT Center and Laboratory Support per Attachment 6 of the MOA between AFIT and AFRL.” Sponsor: AFRL/RV. Funding: \$200,000 – Raquet 50%, Haker 50%.

“ANT Center and Laboratory Support per Attachment 6 of the MOA between AFIT and AFRL.” Sponsor: AFRL/RW. Funding: \$100,000 – Raquet 50%, Fisher 50%.

“Autonomous System Testbed Development.” Sponsor: AFRL/RW. Funding: \$90,000.

“Correlator Beam Forming for GPS Signals.” Sponsor: Locata. Funding: \$70,000 – Raquet 50%, Collins 40%, Haker 10%.

“Support for All-Source Positioning and Navigation (ASPN) Program Phase II.” Sponsor: DARPA. Funding: \$103,000 – Raquet 50%, Woolley 20%, Kauffman 30%.

“Ultra-High Accuracy Reference System (UHARS) Support.” Sponsor: 746 TS/AFMC. Funding: \$50,000 – Raquet 90%, Fisher 10%.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Curro, J., T. Pestak, and J. Raquet, "Boresighting a LiDAR without Accurate Range Measurements for Relative Navigation," Proceedings of 2013 International Technical Meeting of the ION, San Diego, CA, Jan 2013.

Kauffman, K and J. Raquet, "Self-Building World Model for Magnetometer-based Navigation Using a Distributed Sensor Network," *Proceedings of ION GNSS+-2013*, Nashville, TN, Sep 2013.

Kauffman, K., J. Raquet, Y. Morton, and D. Garmatyuk, "Experimental Study of Two-channel UWBOFDM Radar for Indoor Navigation with INS Integration," *Proceedings of ION GNSS+-2013*, Nashville, TN, Sep 2013.

BOOKS AND CHAPTERS IN BOOKS

Garmatyuk, D., K. Kauffman, J. Raquet, Y. Morton, "Multifunctional Software-Defined Radio Sensors for Detection, Imaging, and Navigation," *Low Power Emerging Wireless Technologies*, ed. R. Mahmoudi and K. Iniewski, CRC Press, pp. 99-115, Feb 2013.

PATENTS

Morrison, J., J. Raquet, and M. Veth, "Coded Aperture Aided Navigation and Geolocation System," Patent No. 8,577,538, Issued 5 Nov 2013.

REEDER, MARK F., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

"Flight Testing in the AFIT Low Speed Wind Tunnel." Sponsor: AFRL/RW. Funding: \$15,000 – Reeder 50%, Cobb 50%.

WOOLLEY, BRIAN G., Capt, Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Increased Understanding of Vision-Aided Navigation Uncertainty Estimates." Sponsor: AFRL/RV. Funding: \$25,000.

6.2. CENTER FOR CYBERSPACE RESEARCH

Center for Cyberspace Research (CCR)

Director 255-6565 x4445
Associate Director 255-6565 x7105
Executive Program Coordinator 255-3636 x4602
Homepage: <http://www.afit.edu/en/CCR>

6.2.1. DOCTORAL DISSERTATIONS

DERRISO, MARK M., *Machine Conscious Architecture for State Exploitation and Decision Making*. AFIT/ENG/DS/13M-01. Faculty Advisor: Dr. Richard A. Raines. Sponsor: AFRL/RV.

HARMER, PAUL K., *Development of a Learning from Signals Classifier for Cognitive Software Defined Radio Applications*. AFIT/ENG/DS/13M-02. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV.

KIMBALL, WILLIAM B., *A Formal Approach to Vulnerability Discovery in Binary Programs*. AFIT/ENG/DS/13J-03. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: N/A.

MONTMINY, DAVID P., *Enhancing Electromagnetic Side-Channel Analysis in an Operational Environment*. AFIT/ENG/DS/13S-01. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: N/A.

NOEL, GEORGE E., *Image Annotation and Topic Extraction Using Super-Word Latent Dirichlet Allocation*. AFIT/ENG/DS/13S-03. Faculty Advisor: Dr. Gilbert L. Peterson. Sponsor: AFRL/RI.

REISING, DONALD R., *Exploitation of RF-DNA for Device Classification and Verification Using GRLVQI Processing*. AFIT/ENG/DS/12-04. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV.

STONE, SAMUEL J., *Radio Frequency Based Programmable Logic Controller Anomaly Detection*. AFIT/ENG/DS/13S-05. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV.

6.2.2. MASTER'S THESES

BARTO, WILLIAM C., *Classification of Encrypted Web Traffic Using Machine Learning Algorithms*. AFIT/ENG/13J-11. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: Global Velocity.

BASNIGHT, ZACHARY H., *Firmware Counterfeiting and Modification Attacks on Programmable Logic Controllers*. AFIT/ENG/13M-06. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS.

BOOTH, MATTHEW B., *Verification of Commercial SatCom Device Identities Using Radio Frequency-Distinct Native Attributes (RF-DNA)*. AFIT/ENG/13M-09. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV.

BRISTOW, JONATHAN S., *Learning Enterprise Malware Triage from Automatic Dynamic Analysis*. AFIT/ENG/13M-10. Faculty Advisor: Maj Thomas E. Dube. Sponsor: DHS.

DUBENDORFER, CLAY K., *Using RF-DNA Fingerprints to Discriminate ZigBee Devices in an Operational Environment*. AFIT/ENG/13M-15. Faculty Advisor: Dr. Michael A. Temple. Sponsor: AFRL/RV.

DUNLAP, STEPHEN J., *Timing-Based Side Channel Analysis for Anomaly Detection in the Industrial Control System Environment*. AFIT/ENG/13J-01. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS.

HEARLE, JOHN A., *Side-Channel Analysis of Subscriber Identity Modules*. AFIT/ENG/13J-03. Faculty Advisor: Dr. Rusty O. Baldwin. Sponsor: DHS.

IVERSON, PRESTON B., *Evaluating Change Management Processes and Systems Using ITIL and Business Process Modeling*. AFIT/ENG/13M-26. Faculty Advisor: Dr. Robert F. Mills. Sponsor: 24 AF/26 NOS.

JAROMIN, ROBERT M., *Emulation of Industrial Control Field Device Protocols*. AFIT/ENG/13M-27. Faculty Advisor: Dr. Barry E. Mullins. Sponsor: DHS.

OTIS, JEREMY R., *Evaluation of Cyber Sensors for Enhancing Situational Awareness in the ICS Environment*. AFIT/ENG/13J-06. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: DHS.

SICKENDICK, KARL A., *File Carving and Malware Identification Algorithms Applied to Firmware Reverse Engineering*. AFIT/ENG/13M-46. Faculty Advisor: Maj Thomas E. Dube. Sponsor: DHS.

WELLER-FAHY, DAVID J., *Network Intrusion Dataset Assessment*. AFIT/ENG/13M-49. Faculty Advisor: Dr. Brett J. Borghetti. Sponsor: 711 HPW/RH.

6.2.3. GRADUATE RESEARCH PAPERS

CLARK, RONALD J., *Implementing an Integrated Network Defense Construct*. AFIT/ENG/GRP/13J-01. Faculty Advisor: Maj Jonathan W. Butts. Sponsor: N/A.

RUETER, BRADLEY A., *Cyberspace Integration with the Air Operations Center*. AFIT/ENG/GRP/13J-02. Faculty Advisor: Dr. Robert F. Mills. Sponsor: 24 AF/A3.

6.2.4. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BALDWIN, RUSTY O., Department of Electrical and Computer Engineering

SPONSOR FUNDED EDUCATIONAL PROJECTS

“Federal Cyber Service: Scholarship for Service (SFS).” Sponsor: NSF. Funding: \$283,010.

“Increasing the Federal Cybersecurity Workforce through Graduate Education and Research at AFIT.” Sponsor: NSF. Funding: \$459,489 – Baldwin 50%, Raines 50%.

“NSA Cyber Center of Excellence: Summer Intern Program Cyber Ops Curriculum.” Sponsor: NSA. Funding: \$66,450.

SPONSOR FUNDED RESEARCH PROJECTS

“Joint Integrated Electronic Health Record (iEHR) Initial Operating Capability Support.” Sponsor: TRICARE. Funding: \$655,000.

“Technical Support, Jiseki Development.” Sponsor: NSA. Funding: \$191,434 – Baldwin 75%, Raines 25%.

REFEREED JOURNAL PUBLICATIONS

G. Degirmenci, J. P. Kharoufeh, and R. O. Baldwin, “On the Performance Evaluation of Query-Based Wireless Sensor Networks,” *Performance Evaluation*, Vol. 70, No. 2, pp. 124-147, Feb 2013.

D. P. Montminy, R. O. Baldwin, M. A. Temple, and E. D. Laspe, “Improving Cross-Device Attacks using Zero-Mean Unit-Variance Normalization,” *Journal of Cryptographic Engineering*, Vol. 3, No. 2, pp. 99-110, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

W. M. S. Stout and R. O. Baldwin, "Network Performance Impact of Access Control Policies in Tactical Wireless Networks," 2012 IEEE Military Communications Conference (MILCOM 2012), Orlando, FL, Oct 2012, 1-6.

H. Patel and R. O. Baldwin, "Differential Power Analysis Using Wavelet Decomposition," 2012 IEEE Military Communications Conference (MILCOM 2012), Orlando, FL, Oct 2012, 1-5.

H. Patel and R. O. Baldwin, "GPU Accelerated Differential Power Analysis," 2012 IEEE Military Communications Conference (MILCOM 2012), Orlando, FL, Oct 2012, 1-5.

PATENTS

W. E. Cobb, M. A. Temple, R. O. Baldwin, E. W. Garcia, and E. D. Laspe, "A Method for the Intrinsic Physical Layer Authentication of Integrated Circuits," Provisional Patent #13/663,051, 29 Oct 2012.

W. Kimball and R. O. Baldwin, "Emulation-Based Software Protection," Patent #8,285,987, 9 Oct 2012.

BUTTS, JONATHAN W., Maj, Department of Electrical and Computer Engineering

REFEREED JOURNAL PUBLICATIONS

C. Finke, J. Butts, R. Mills, M. Grimalia, "Enhancing the security of aircraft surveillance in the next generation air traffic control system," Int'l. Journal of Critical Infrastructure Protection, Vol. 6(1), pp. 3-11, Mar 2013.

J. Butts, M. Rice and S. Sheno, An Adversarial Model for Cyber Attack on Control Protocols, Journal of Defense Modeling and Simulation, Vol. 9(3), pp. 243-255, 2012.

D. Magazu, R. Mills, J. Butts, D. Robinson, "Exploiting Automatic Dependent Surveillance-Broadcast via False Target Injection," Journal of Aviation and Aerospace Perspectives, Vol. 2(2), pp. 5-19, Fall 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Z. Basnight, J. Butts, J. Lopez, T. Dube, "Analysis of Programmable Logic Controller Firmware for Threat Assessment and Forensic Investigation," 8th Int'l. Conf. on Information Warfare and Security, Denver, CO, USA, 25-26 Mar 2013.

D. Berman, J. Butts, "Towards characterization of cyber attacks on industrial control systems: Emulating field devices using Gumstix technology," 5th Int'l Symposium on Resilient Control Systems, Salt Lake City, UT, USA, 14-16, 2012.

C. Finke, J. Butts, R. Mills, M. Grimalia, "Evaluation of a Cryptographic Security Scheme for Air Traffic Control's Next Generation Upgrade," 8th Int'l. Conf. on Information Warfare and Security, Denver, CO, USA, 25-26 Mar 2013.

C. Arnold, J. Butts, K. Thirunarayan, "Strategies for Combating Sophisticated Attacks," 8th International Conference on Information Warfare and Security, Denver, CO, USA, 25-26 Mar 2013.

C. Finke, J. Butts, R. Mills, "ADS-B Encryption: Ensuring Confidentiality in the Friendly Skies," 8th Annual Cyber Security and Information Intelligence Research Workshop, Oak Ridge, TN, USA, 8-10 Jan 2013.

R. Jaromin, B. Mullins, J. Butts, "Applications and Design of Industrial Control Emulators," 7th Annual IFIP WG 11.10 International Conference on Critical Infrastructure Protection, Washington, DC, USA, 18-20 Mar 2013.

R. Clark, J. Butts, R. Mills, "Implementing an Integrated Network Defense Construct," 18th International Command and Control Research and Technology Symposium, Fairfax, VA, USA, 19-21 Jun 2013.

B. Rueter, R. Mills, J. Butts, "Cyberspace Integration within the Air Operations Center," 18th International Command and Control Research and Technology Symposium, Fairfax, VA, USA, 19-21 Jun 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

J. Otis, D. Berman, J. Butts, J. Lopez, "ICS logging solution for network-based attacks using Gumistix technology," 2013 SPIE Defense, Security + Sensing Conference, Baltimore, MD, USA, 29 Apr - 3 May.

BOOKS AND CHAPTERS IN BOOKS

J. Butts and S. Sheno (Editors): Critical Infrastructure Protection VI, Springer, New York, 2012.

DUBE, THOMAS E., Maj, Department of Electrical and Computer Engineering

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Z. Basnight, J. Butts, J. Lopez, T. Dube, "Analysis of Programmable Logic Controller Firmware for Threat Assessment and Forensic Investigation," 8th Int'l. Conf. on Information Warfare and Security, Denver, CO, USA, 25-26 Mar 2013.

GRMAILA, MICHAEL R., Department of Systems Engineering and Management

SPONSOR FUNDED RESEARCH PROJECTS

"Communication Systems Security." Sponsor: LTS. Funding: \$115,000 – Grmaila 50%, Hodson 50%.

MILLS, ROBERT F., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"Cognitive Electronic Warfare." Sponsor: AFRL/RV. Funding: \$50,000.

REFEREED JOURNAL PUBLICATIONS

Bryant, A., Mills, R., Grmaila, M., and Peterson, G. "Top-level goals in reverse engineering executable software," *Journal of Information Warfare*, Vol. 12:1, May 2013, pp 32-43.

Finke, C., Butts, J., Mills, R., and Grmaila, M. "Enhancing the security of aircraft surveillance in the next generation air traffic control system," *International Journal of Critical Infrastructure Protection*, available online 20 Feb 2013, pp, 1-20, <http://dx.doi.org/10.1016/j.ijcip.2013.02.001>.

Magazu, D., Mills, R.F., Butts, J.W., and Robinson, D.J., "Exploiting Automatic Dependent Surveillance-Broadcast via False Target Injection," *Journal of Aviation and Aerospace Perspectives*, Vol. 2(2), pp. 5-19, Fall 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Rueter, B., Mills, R.F., and Butts, J. "Cyberspace Integration within the Air Operations Center," International Command and Control Research and Technology Symposium (ICCRTS), Alexandria, Virginia, 19-21 Jun 2013.

Clark, R., Butts, J., and Mills, R.F., "Implementing an Integrated Network Defense Construct," International Command and Control Research and Technology Symposium (ICCRTS), Alexandria, Virginia, 19-21 Jun 2013.

Bryant, A., Mills, R., Grimaila, M., and Peterson, G. "Investigating Human Factors Considerations in Reverse Engineering Executable Software," 8th International Conference on Information Warfare and Security (ICIW 2013), pp. 16-23, Denver CO, 25-26 Mar 2013.

Finke, C., Butts, J., Mills, R., and Grimaila, M. "Evaluation of Cryptographic Security Schemes for Air Traffic Control's Next Generation Upgrade," 8th International Conference on Information Warfare and Security (ICIW 2013), pp. 259-264, Denver CO, 25-26 Mar 2013.

Finke, C., Butts, J., and Mills, R., "ADS-B Encryption: Ensuring Confidentiality in the Friendly Skies," Proceedings of the Cyber Security and Information Intelligence Research Workshop (CSIIRW 2013, Oak Ridge National Laboratory, Oak Ridge, TN, Jan 8-13, 2013.

MULLINS, BARRY E., Department of Electrical and Computer Engineering

SPONSOR FUNDED EDUCATIONAL PROJECTS

"IASP Tuition and Resource Support for the AFIT Center for Cyberspace Research (CCR)." Sponsor: NIETP. Funding: \$19,665 – Mullins 50%, Raines 50%.

SPONSOR FUNDED RESEARCH PROJECTS

"Development and Implementation of a Testbed for Research and Analysis of Malware." Sponsor: DHS. Funding: \$225,000 – Mullins 20%, Humpheries 20%, Butts 20%, Robinson 20%, Raines 20%.

REFEREED JOURNAL PUBLICATIONS

D. R. Karrels, G. L. Peterson and B. E. Mullins, "Large-scale cooperative task distribution on peer-to-peer networks," *Web Intelligence and Agent Systems*, Vol. 11, No. 1, 2013, pp. 67-79.

B. E. Mullins, "Developing Cyber Warriors from Computer Engineers et al.," *American Society for Engineering Education (ASEE) Computers in Education Journal*, Vol. 3, No. 4, Oct-Dec 2012, pp. 26-35.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

J. T. Hagen and B. E. Mullins, "TCP Veto: A Novel Network Attack and its Application to SCADA Protocols," *2013 IEEE PES Conference on Innovative Smart Grid Technologies*, Washington DC, Feb 2013, pp. 1-6.

B. W. Ramsey, M. A. Temple, and B. E. Mullins, "PHY Foundation for Multi-Factor ZigBee Node Authentication," *2012 IEEE Global Communications Conference (GLOBECOM 12)*, Anaheim CA, Dec 2012, pp. 813-818.

B. W. Ramsey, B. E. Mullins, and Edward D. White, "Improved Tools for Indoor Zigbee Warwalking," *7th International Workshop on Practical Issues in Building Sensor Network Applications 2012* (SenseApp 2012), Clearwater FL, Oct 2012, pp. 925-928.

PETERSON, GILBERT L., Department of Electrical and Computer Engineering

REFEREED JOURNAL PUBLICATIONS

Karrels, D.R., Peterson, G.L., and Mullins, B.E., "Large-scale Cooperative Task Distribution on Peer-to-Peer Networks," *Web Intelligence and Agent Systems*, Vol. 11, No. 1, 2013, pp. 67-79.

Bryant, A., Mills, R., Grimaila, M., and Peterson, G., "Top-level Goals in Reverse Engineering Executable Software," *Journal of Information Warfare*, Vol. 12, No. 1, 2013, pp. 32-43.

Grimaila, M.R., Myers, J., Mills, R.F., and Peterson, G.L., "Design and Analysis of a Dynamically Configured Log-based Distributed Security Event Detection Methodology," *The Journal of Defense*

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Bryant, A.R., Mills, R.F., Grimaila, M.R., and Peterson, G.L., "Top-Level Goals in Reverse Engineering Executable Software," 8th International Conference on Information Warfare and Security ICIW-2013, 2013, pp. 16-23.

TEMPLE, MICHAEL A., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

"RFINT Algorithm Development." Sponsor: ORNL. Funding: \$45,000.

"RFINT for Commercial Communications." Sponsor: AS&T. Funding: \$90,032.

REFEREED JOURNAL PUBLICATIONS

Montminy, Baldwin, Temple, and Laspe, "Improving Cross-Device Attacks Using Zero-Mean Unit-Variance Normalization," Jour of Cryptologic Engineering, Springer, Vol. 3, No. 2, pp. 99-110, Jun 2013.

Stone, Temple, "RF-Based Anomaly Detection for PLCs in Critical Infrastructure Apps," *Int'l Jour on Critical Infrastructure Protection*, Vol. 5, No. 2, pp. 66-73, 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Kuciapinski, Temple, Werling, McGuire, "(U) RFINT for Satellite Communications," *2013 Nat'l SIGINT Development Conf*, Baltimore MD, Classified Proceedings, Jun 2013.

Harmer, Reising, Temple, Lopez, "Classifier Selection for Physical Layer Security Augmentation in Cognitive Radio Networks," 2013 IEEE Int'l Conf on Communications (ICC13), Jun 2013, Budapest, Hungary.

Harmer, Temple, "An Improved LFS Engine for Physical Layer Security Augmentation in Cognitive Networks," Int'l Conf on Computing, Networking and Communications (ICNC13), San Diego, CA, Jan 2013, pp. 719-723.

Ramsey, Temple, Mullins, "PHY Foundation for Multi-Factor ZigBee Node Authentication," *2012 IEEE Global Communications Conf (GLOBECOM12)*, Anaheim, CA, Dec 2012, pp. 795-801.

Booth, Killpack, Kuciapinski, Temple, "(U) RF-DNA Applied to Commercial SatCom," *2012 Military Communications Conf (MILCOM12)*, Classified Proceedings, 978-1-4673-3C/pp. 28-32, Orlando, FL, Oct 2012.

Dubendorfer, Ramsey, Temple, "An RF-DNA Verification Process For ZigBee Networks," *2012 Military Communications Conf (MILCOM12)*, Unclassified Proceedings, 978-1-4673-3/pp. 12-16, Orlando, FL, Oct 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Armijos, Lanzerotti, Silvius, Temple, Martin, Cerny, Ovenshire, Fisher, "High-Speed Tunable Filters for Agile RF Receivers," *2013 Government Microcircuit Apps & Critical Tech Conference (GOMAC13)*, Las Vegas, NV, 11-15, Mar 2013.

6.3. CENTER FOR DIRECTED ENERGY

Center for Directed Energy (CDE)

Director 255-3636 x4506

Executive Administrator 255-3636 x4551

Homepage: <http://www.afit.edu/en/DE>

6.3.1. DOCTORAL DISSERTATIONS

GALLAGHER, JEFFREY E., *Optically Pumped Atomic Rubidium Lasers: Two-Photon and Exciplex Excitation Mechanisms*. AFIT/ENP/DS/13J-01. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO.

LOPER, ROBERT D., *Collisional Broadening and Shift of D1 and D2 Spectral Lines in Atomic Alkali Vapor - Noble Gas Systems*. AFIT/ENP/DS/13M-03. Faculty Advisor: Dr. David E. Weeks. Sponsor: HELJTO.

RICE, CHRISTOPHER A., *Investigation of Diode Pumped Alkali Laser Atmospheric Transmission Using Tunable Diode Laser Absorption Spectroscopy*. AFIT/ENP/DS/12D-07. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO.

SEAL, MICHAEL D., *Directional Thermal Emission and Absorption from Surface Microstructures in Metalized Plastics*. AFIT/ENP/DS/13S-03. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: N/A.

VAP, JASON C., *Design and Characterization of Optical Metamaterials Using Tunable Polarimetric Scatterometry*. AFIT/ENP/DS/12-03. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: N/A.

6.3.2. MASTER'S THESES

ADOMANIS, BRYAN M., *A Characterization Study of Highly-Tailorable 3-D Metamaterials in the Thermal Infrared for Spectral and Directive Emission Behaviors*. AFIT/ENP/13M-01. Faculty Advisor: Dr. Michael A. Marciniak. Sponsor: AFRL/RX.

ESHEL, BEN, *Spectral Analysis and Metastable Absorption Measurements of High Pressure Capacitively and Inductively Coupled Radio-Frequency Argon Helium Discharges*. AFIT/ENP/13J-02. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO.

GUY, MATTHEW R., *Investigation of the Atmospheric Propagation of Alkali Lasers in a Maritime Environment Using Tunable Diode Laser Atmospheric Spectroscopy*. AFIT/ENP/13M-12. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO.

LLOYD, ROBERT L., *Multipactor Discharge in High Power Microwave Systems: Analyzing Effects and Mitigation through Simulation in ICEPIC*. AFIT/ENP/13M-22. Faculty Advisor: Dr. William F. Bailey. Sponsor: AFRL/RD.

RICHARDS, RYAN M., *Mirrorless Lasing in Optically Pumped Rubidium Vapor*. AFIT/ENP/13M-41. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO.

TAGUBA, CHAD T., *Pump Diode Characterization for an Unstable Diode-Pumped Alkali Laser Resonator*. AFIT/ENP/13M-33. Faculty Advisor: Dr. Glen P. Perram. Sponsor: HELJTO.

6.3.3. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BAILEY, WILLIAM F., Department of Engineering Physics

REFEREED JOURNAL PUBLICATIONS

William J. Palm, Michael A. Marciniak, Glen P. Perram, Kevin C. Gross, and William F. Bailey, "Wavelength- and temperature-dependence of CW laser absorptance in Kapton® thin films," *Optical Engineering*, Vol. 51, Article No. 121802, Dec 2012.

FIORINO, STEVEN T., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

"2013 AFIT Center for Directed Energy Summer Intern (DESI) Program." Sponsor: HELJTO. Funding: \$50,000 – Fiorino 90%, Perram 5%, Marciniak 5%.

"AFIT Support to Propagation Testing with HELSTF SSLTE Phase II." Sponsor: HELJTO. Funding: \$53,000.

"Airborne Aero-Optics Lab Beam Control Collection and Evaluation." Sponsor: HELJTO. Funding: \$107,612.

"Beam Control for Optical Phased Array Weapons." Sponsor: tOSC. Funding: \$30,000.

"CY2013 HEL JTO M&S TAWG Product Development." Sponsor: HELJTO. Funding: \$300,000.

"High Energy Laser-Joint Technology Office Predictive Avoidance Subject Matter Expert." Sponsor: HELJTO. Funding: \$25,000.

"Jump-Start Verification and Validation Efforts." Sponsor: HELJTO. Funding: \$45,875.

"Modification of AFIT Atmospheric Effects Software Code for AFRL/Ry." Sponsor: AFRL/Ry. Funding: \$50,000 – Fiorino 45%, Cusumano 45%, Randall 10%.

"Modification of AFIT Atmospheric Effects Software Code for AFRL/Ry." Sponsor: AFRL/Ry. Funding: \$50,000.

"Propagation Testing Under Harsh Conditions." Sponsor: HELJTO. Funding: \$40,000.

"Research and Development in Directed Energy Applications." Sponsor: MZA. Funding: \$30,000.

"Wave Optics of Deep Atmospheric Turbulence: From Underlying Physics towards Predictive Modeling Mitigation and Exploitation." Sponsor: AFOSR. Funding: \$360,000 – Fiorino 55%, Cusumano 45%.

REFEREED JOURNAL PUBLICATIONS

Van Zandt, N.R., S.T. Fiorino, and K.J. Keefer, "Enhanced, fast-running scaling law model of thermal blooming and turbulence effects on high energy laser propagation," *Optics Express*, Vol. 21, pp. 14789-14798 (2013).

Krizzo, M.J., S.J. Cusumano, S.T. Fiorino, R. Heap, V. Velton, J. Brown, and R.J. Bartell, "Design, development and in-flight testing of a pointer/tracker for in-flight experiments to measure the aero-optical effects over a scaled turret," *Optical Engineering*, Vol. 52, Article No. 071415/1-8 (2013).

- Hyde, M.W., S. Basu, M.F. Spencer, S.J. Cusumano, and S.T. Fiorino, "Physical optics solution for the scattering of a partially-coherent wave from a statistically rough material surface," *Optics Express*, Vol. 21, pp. 6807–6825 (2013).
- Basu, S., M.W. Hyde, S.J. Cusumano, M.A. Marciniak, and S.T. Fiorino, "Examining the Validity of Using a Gaussian Schell-Model Source to Model the Scattering of a Fully-Coherent Gaussian Beam from a Rough Impedance Surface," *Optical Engineering*, Vol. 52, Article No. 038001/1-9 (2013).
- Fiorino, S.T., R.M. Randall, F.J. Echeverria, R.J. Bartell, M.J. Krizo, and S.J. Cusumano, "Effectiveness Assessment of Tactical Laser Engagement Scenarios in the Lower Troposphere," *AIAA Journal of Aerospace Information Systems*, Vol. 10, pp. 32-39 (2013).
- Van Zandt, N.R., S.J. Cusumano, R.J. Bartell, S. Basu, J.E. McCrae, S.T. Fiorino, "Comparison of coherent and incoherent laser beam combination for tactical engagements," *Optical Engineering*, Vol. 51, Article No. 104301/1-19 (2013).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

- Fiorino S. and L. Burchett., "Measurement of C_n^2 Profiles from Weather Radar Data and other Microwave Signals and Conversion to Visible and NIR C_n^2 Profiles," Propagation through and Characterization of Distributed Volume Turbulence (pcDVT), Proceedings of the Imaging and Applied Optics Conference, Paper No. PTu1F.1 (2013).
- Basu S., M.W. Hyde, J.E. McCrae, and S.T. Fiorino, "Scattering from a rough surface in presence of atmospheric turbulence," Proceedings of SPIE Defense, Security and Sensing Symposium, Vol. 8732, Paper No. 87320G (2013).
- Van Zandt, N.R., J.E. McCrae, and S.T. Fiorino, "PITBUL: a physics-based modeling package for imaging and tracking of airborne targets for HEL applications including active illumination," Proceedings of SPIE Defense, Security and Sensing Symposium, Vol. 8732, Paper No. 87320H (2013).
- McCrae, J.E., N.R. Van Zandt, S.J. Cusumano and S.T. Fiorino, "Simulation of atmospheric turbulence compensation through piston only phase control of a laser phased array," Proceedings of SPIE Defense, Security and Sensing Symposium, Vol. 8733, Paper No. 873311 (2013).
- Fiorino, S. T., M.F. Via, K.J. Keefer, S.M. Shirey, J.T. Engel, and B.J. Elmore, "Effectiveness of Using Gridded Forecast Data in Hyperspectral Radiative Transfer Analyses and High Energy Laser Mission Planning," Proceedings of the 93rd American Meteorological Society Annual Meeting, Austin, TX, 6-10 Jan 2013. <https://ams.confex.com/ams/93Annual/webprogram/Paper221761.html>.

GROSS, KEVIN C., Department of Engineering Physics

REFEREED JOURNAL PUBLICATIONS

- William J. Palm, Michael A. Marciniak, Glen P. Perram, Kevin C. Gross, and William F. Bailey, "Wavelength- and temperature-dependence of CW laser absorptance in Kapton® thin films," *Optical Engineering*, Vol. 51, Article No. 121802, Dec 2012.
- Christopher A. Rice, Kevin C. Gross, and Glen P. Perram. "Investigation of atmospheric O₂ X³Σ⁻g – b¹Σ⁺g using open path tunable diode laser absorption spectroscopy," *Applied Physics B: Lasers & Optics*, Vol. 111, pp. 173–182 (2013). <http://dx.doi.org/10.1007/s00340-012-5243-y>; Published online 31-Mar-2013.

HAGER, GORDON D., Department of Engineering Physics

REFEREED JOURNAL PUBLICATIONS

- G. D. Hager and G. P. Perram, "A three level model for alkali metal vapor lasers: Part II. Broadband optical pumping" *Applied Physics B: Lasers & Optics*, Vol. 112, pp. 507-520 (Sept 2013).

HYDE, MILO W., Department of Electrical and Computer Engineering

SPONSOR FUNDED RESEARCH PROJECTS

“Phase Unwrapping Experiments in Strong Turbulence.” Sponsor: AFOSR. Funding: \$68,600.

“Beam Control for Optical Phased Array Weapons.” Sponsor: tOSC. Funding: \$103,125.

MARCINIAK, MICHAEL A., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

“Dynamic Data-Driven BRDF Measurement System.” Sponsor: AFRL/RV. Funding: \$200,000.

“Indirect Photography.” Sponsor: AFOSR. Funding: \$43,827.

“Thin-Film Research for Infrared Optical Coatings and Meta-Materials.” Sponsor: DAGSI. Funding: \$43,500.

REFEREED JOURNAL PUBLICATIONS

W.J. Palm, M.A. Marciniak, G.P. Perram, K.C. Gross, W.F. Bailey, and C.T. Walters, “Wavelength- and temperature-dependence of CW laser absorptance in Kapton® thin films,” *Optical Engineering*, Vol. 51, Article No. 121802/1-8 (Dec 2012).

M.A. Marciniak, S.R. Sellers, R.B. Lamott, and B.T. Cunningham, “Bidirectional scatter measurements of a Guided Mode Resonant Filter photonic crystal structure,” *Optics Express*, Vol. 20, pp. 27242-27252 (Dec 2012).

S. Basu, M.W. Hyde IV, S.J. Cusumano, M.A. Marciniak, and S.T. Fiorino, “Examining the validity of using a Gaussian Schell-model source to model the scattering of a fully coherent Gaussian beam from a rough impedance surface,” *Optical Engineering*, Vol. 52, Article No. 038001/1-9 (Mar 2013).

J.C. Vap, S.E. Nauyoks and M.A. Marciniak, “Optimization of a tunable infrared Mueller-matrix scatterometer,” *Measurement Science and Technology* Vol. 24, Article No. 055901/1-8 (Mar 2013).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

J. Lewoczko, S. Nauyoks and M.A. Marciniak, “Dynamic Data-Driven Bidirectional Reflectance Distribution Function,” *Proceedings of the 15th Annual Directed Energy Annual Symposium*, Albuquerque, NM, 26-30 Nov 2012.

C.D. Roberts, R.A. Acosta, M.A. Marciniak and G.P. Perram, “Hyper-spectral and gated ICCD imagery for laser irradiated carbon materials,” SPIE Photonics West, *Proceedings of the SPIE*, Vol. 8603, Paper No. 8603-25 (2013).

B.M. Adomanis, D.B. Burckel and M.A. Marciniak, “A characterization study of highly-tailorable 3-D metamaterials in the thermal infrared for selective emission behaviors,” *Proceedings of the SPIE*, Vol. 8806, Paper No. 8806-33 (2013).

NAUYOKS, STEPHEN E., Department of Engineering Physics

REFEREED JOURNAL PUBLICATIONS

J.C. Vap, S.E. Nauyoks and M.A. Marciniak, “Optimization of a tunable infrared Mueller-matrix scatterometer,” *Measurement Science and Technology* Vol. 24, Article No. 055901/1-8 (Mar 2013).

PERRAM, GLEN P., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

“Diode Pumped Rare Gas Lasers.” Sponsor: HELJTO. Funding: \$249,664.

“HEL Analysis Tool with Experimentally Corroborated DPAL Rate Constants.” Sponsor: MDA. Funding: \$13,783.

“Merging Hyperspectral Imagery and Multi-Scale Modeling for Laser Lethality.” Sponsor: AFOSR. Funding: \$463,811 – Perram 80%, Marciniak 20%.

“Pulsed Detonation Driven Gas Dynamic Laser.” Sponsor: AFRL/RQ. Funding: \$53,000.

“Rubidium Vapor Circulation System: Optical Diagnostics.” Sponsor: MDA. Funding: \$4,804.

“Validated Atmospheric Propagation for Diode Pumped Alkali Lasers.” Sponsor: HELJTO. Funding: \$62,000.

REFERRED JOURNAL PUBLICATIONS:

J. D. Hewitt, T. J. Houlahan, Jr., J. E. Gallagher, D. L. Carroll, A. D. Palla, J. T. Verdeyen, G. P. Perram, and J. G. Eden, “Role of Excited State Photoionization in the 852.1 nm Cs Laser Pumped by Cs-Ar Photoassociation,” *Applied Physics Letters*, Vol. 102, Article No. 111104 (Mar 2013).

Kirk C. Brown and Glen P. Perram “Demonstration of a 459-nm pulsed, optically-pumped cesium vapor laser,” *Optics Communications*, Vol. 300, pp. 51–57 (Jul 2013).

Christopher A. Rice, Gordon Lott and Glen P. Perram, “Open-path atmospheric transmission for the diode pumped cesium laser,” *Applied Optics*, Vol. 51, pp. 8102–8110 (Feb 2013).

Christopher A. Rice, Kevin C. Gross, and Glen P. Perram, “Investigation of atmospheric O₂ X – b using open-path tunable diode laser absorption spectroscopy,” *Applied Physics B*, Vol. 111, pp. 173-182 (May 2013).

William J. Palm, Michael A. Marciniak, Glen P. Perram, Kevin C. Gross, and William F. Bailey, “Wavelength- and temperature-dependence of CW laser absorptance in Kapton® thin films,” *Optical Engineering*, Vol. 51, Article No. 121802, Dec 2012.

G. D. Hager and G. P. Perram, “A three level model for alkali metal vapor lasers: Part II. Broadband optical pumping,” *Applied Physics B*, Vol. 112, pp. 507-520 (Sep 2013).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW:

Charles D. Roberts, Roberto A. Acosta, Michael A. Marciniak and Glen P. Perram, “Hyperspectral and gated ICCD imagery for laser irradiated carbon materials,” Photonics West, *Proceedings of the SPIE*, Vol. 86030Q, 2-7 Feb 2013, San Francisco, CA.

Christopher A. Rice, Matthew Guy and Glen P. Perram, “Effects of atmospheric transmission of high power diode pumped alkali lasers,” Photonics West, *Proceedings of the SPIE*, Vol. 86100S, 2-7 Feb 2013, San Francisco, CA.

Jeffrey E. Gallagher and Glen P. Perram, “Two photon absorption and Stimulated Raman Scattering in alkali vapor lasers,” Photonics West, *Proceedings of the SPIE*, Vol. 8604-3, 2-7 Feb 2013, San Francisco, CA.

6.4. CENTER FOR OPERATIONAL ANALYSIS

Center for Operational Analysis (COA)

Director 255-6565 x4708

Projects Director 255-6565 x4251

Homepage: <http://www.afit.edu/en/COA>

6.4.1. DOCTORAL DISSERTATIONS

HARTMAN, PAUL L., *The Outsourcing-to-Insourcing Relocation Shift: A Response of U.S. Manufacturers to the Outsourcing Paradigm*. AFIT/ENS/DS/13J-18. Faculty Advisor: Dr. Jeffrey A. Ogden. Sponsor: SAF.

6.4.2. MASTER'S THESES

BIGLEY, ANDREW L., *Horn's Curve Estimation Through Multi-Dimensional Interpolation*. AFIT/ENS/13M-01. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/R.Y.

BOLT, KARL E., *Supplier Quality Assessment Requirements (SQAR) and TAG Submission Analysis: Improving the Initial Submission Process at the F-22 Depot*. AFIT/ENS/13M-02. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AFMC/309 AMXG.

CLAPP, BENJAMIN A., *Vehicle Minimization for the Multimodal Pickup and Delivery Problem with Time Windows*. AFIT/ENS/13M-03. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM.

FINKBEINER, SCOTT C., *Urgent Aeromedical Evacuation Network Capacity Planning*. AFIT/ENS/13M-04. Faculty Advisor: Dr. Jeffery K. Cochran. Sponsor: AMC.

HAFICH, MICAH J., *A Mixed Integer Programming Model for Improving Theater Distribution Force Flow Analysis*. AFIT/ENS/13M-05. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM.

HILLMAN, ALEXANDER P., *Aerial Refueling Simulator Validation Using Operational Experimentation and Response Surface Methods with Time Series Responses*. AFIT/ENS/13M-06. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD.

HUBER, TROY T., *Identifying, Tracking, and Prioritizing Parts Unavailability*. AFIT/ENS/13M-07. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AFMC/A4.

KIEFFER, MITCHELL R., *Traumatic Brain Injury Recovery Care: Demand Forecasting, Staffing, and Treatment Planning*. AFIT/ENS/13M-08. Faculty Advisor: Dr. Jeffery K. Cochran. Sponsor: AFW2.

LEONARD, TAYLOR J., *Operational Planning of Channel Airlift Missions Using Forecasted Demand*. AFIT/ENS/13M-09. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM.

LESSIN, AARON M., *Estimating the Probability of Being the Best System: A Generalized Method and Nonparametric Hypothesis Test*. AFIT/ENS/13M-10. Faculty Advisor: Dr. John O. Miller. Sponsor: AFMC/AFSC.

MEENTS, JOSHUA B., *Control Variates and Optimal Designs in Metamodeling*. AFIT/ENS/13M-11. Faculty Advisor: Dr. Mark A. Friend. Sponsor: ACC/53 TMG.

MORRILL, DANA F., *Overestimating Ballistic Flash with Biased Linear Regression*. AFIT/ENS/13M-13. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: AFMC/96 TG.

OZDEMIR, ALHMET, *Evaluating Courses of Actions at the Strategic Planning Level*. AFIT/ENS/13M-14. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: TuAF.

PEK, EDMUND K., *Development of Availability and Sustainability Spares Optimization Models for Aircraft Repairables*. AFIT/ENS/13S-4. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: MINDEF.

RABON, ROBERT S., *Continuous Process Improvement at Tinker Air Logistics Complex*. AFIT/ENS/13M-16. Faculty Advisor: Dr. Kenneth L. Schultz. Sponsor: AFMC/A4.

RITTER, SEAN C., *An Examination of Statistical Rigor Infused into the KC-46 Flight Test Program*. AFIT/ENS/13M-18. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: OSD.

ROBERTS, MATTHEW D., *An Empirical Investigation of USAF Logistics Readiness Officer Mission Sets*. AFIT/ENS/13M-19. Faculty Advisor: Maj Christian E. Randall. Sponsor: HQ USAF/A4.

SILVA, PAULA F., *Activity-Based Calculation Models for the Brazilian Air Force Cellular Unit of Intendancy*. AFIT/ENS/13M-21. Faculty Advisor: Lt Col Bradley E. Anderson. Sponsor: Brazilian Air Force.

THOMPSON, DAVID M., *USAF Aircraft Maintenance Officer Knowledge, Skills and Abilities and Commonalities among the Logistics Officer Corps*. AFIT/ENS/13M-22. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: HQ USAF/A4.

WHITSON, CHAD W., *Strategic Consolidation of Medical War Reserve Material (WRM) Equipment Unit Type Codes (UTC) Assemblages*. AFIT/ENS/13M-23. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AFMLO.

6.4.3. GRADUATE RESEARCH PAPERS

ANDERSON, JASON R., *Drawing the Red Line: Cost Benefit Analysis on Large Life Rafts*. AFIT/ENS/GRP/13J-1. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: AMC/A3.

BERGIN, DAVID M., *Use of Demographics to Predict High Risk Individuals for Suicide*. AFIT/ENS/GRP/13J-15. Faculty Advisor: Lt Col Sharon G. Heilmann. Sponsor: N/A.

BROYLES, PHILIP N., *F-22 Depot Level Maintenance Delay and Disruption Record (DDR) Analysis*. AFIT/ENS/GRP/13J-16. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AFMC/309 AMXG.

CHAPA, MARK A., *Predicting Aircraft Availability*. AFIT/ENS/GRP/13J-2. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AMC/A4.

GRAHAM, STEPHEN C., *Aeromedical Evacuation Capacity Analysis for Defense Support of Civil Authorities*. AFIT/ENS/GRP/13J-3. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC/A9.

HAGES, LEE D., *Quantifying the European Strategic Airlift Gap*. AFIT/ENS/GRP/13J-4. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: EUCOM/USAFE.

HALL, ZACHARY G., *C-17A Sustainment Performance Metrics Assessment: Repair Source Impact on Sustainment for Future Business Case Analysis Development*. AFIT/ENS/GRP/13J-17. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: AFLCMC.

ISACCO, JOHN J., *Cost Avoidance Techniques for RC-135 Program Flying Training*. AFIT/ENS/GRP/13J-19. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: N/A.

LANGSTROTH, THEODORE A., IV, *Forecasting Demand for KC-135 Sorties: Deploy to Dwell Impacts*. AFIT/ENS/GRP/13J-15. Faculty Advisor: Lt Col Bradley E. Anderson. Sponsor: AMC/A9.

MCALLISTER, ROBERT D., *Overcoming KC-10 Formal Training Unit Pilot Production Challenges*. AFIT/ENS/GRP/13J-6. Faculty Advisor: Lt Col Doral E. Sandlin. Sponsor: AMC/60 OG.

MORALES, MICHAEL, *Managing Airborne Relief during International Disasters*. AFIT/ENS/GRP/13J-7. Faculty Advisor: Lt Col Doral E. Sandlin. Sponsor: AFRC.

OELRICH, AARON J., *AMD and TACC Consolidation: A Delphi Study*. AFIT/ENS/GRP/13J-8. Faculty Advisor: Dr. Alan R. Heminger. Sponsor: AMC/TACC.

PANKOSKI, JEREMY L., *A Delphi Study to Determine Variables for Predictive MICAP Modeling*. AFIT/ENS/GRP/13J-21. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AFMC/SCOG.

PIPER, RALPH E., *"To Be or Not To Be" ...Perceived Benefits of Mentoring in The United States Air Force*. AFIT/ENS/GRP/13J-22. Faculty Advisor: Lt Col Sharon G. Heilmann. Sponsor: N/A.

RYAN, LISA B., *Advancing Forward-Looking Metrics: A Linear Program Optimization and Robust Variable Selection for Change in Stock Levels as a Result of Recurring MICAP Parts*. AFIT/ENS/GRP/13J-9. Faculty Advisor: Dr. Darryl K. Ahner. Sponsor: AFMC/AFSC.

SIMONCIC, ADAM D., *Aircraft Block Speed Calculations for JOSAC/USTRANSCOM Aircraft Using Linear Regression*. AFIT/ENS/GRP/13J-23. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: USTRANSCOM.

SIVILLE, JAMES L., *The Air Mobility En Route System: A Paradigm Shift?* AFIT/ENS/GRP/13J-10. Faculty Advisor: Dr. Jeffery D. Weir. Sponsor: AMC/A8.

SUMMERS, MARC W., *E² Cargo Transport-The Necessary Inclusion of Primary Oceanic Airlift*. AFIT/ENS/GRP/13J-11. Faculty Advisor: Lt Col Daniel D. Mattioda. Sponsor: AMC/A9.

SZWARC, MEGHAN M., *The Air Force System Acquisition Management Manpower Regression Analysis*. AFIT/ENS/GRP/13J-24. Faculty Advisor: Dr. Raymond R. Hill. Sponsor: AFMA.

THEISS, RYAN L., *Identifying Factors that Most Strongly Predict Aircraft Reliability Behavior*. AFIT/ENS/GRP/13J-12. Faculty Advisor: Dr. Alan W. Johnson. Sponsor: AMC/A9.

THOMAS, MARK R., *Determining Intra-Theater Airlift Requirements from Number of Personnel Deployed in a Region*. AFIT/ENS/GRP/13J-13. Faculty Advisor: Lt Col Doral E. Sandlin. Sponsor: AMC/A9.

WADDELL, ELWOOD T., JR., *Online Cluster Analysis Supporting Real Time Anomaly Detection in Hyperspectral Imagery*. AFIT/ENS/GRP/13J-25. Faculty Advisor: Dr. Kenneth W. Bauer. Sponsor: AFRL/RV.

WICK, STEVEN P., *Incentivizing CRAF Beyond 2014*. AFIT/ENS/GRP/13J-14. Faculty Advisor: Dr. William A. Cunningham. Sponsor: AMC/A9.

6.4.4. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

AHNER, DARRYL K., Department of Operational Sciences

SPONSOR FUNDED RESEARCH PROJECTS

“A System of Equations to Capture SSTRO Dynamics.” Sponsor: CAA. Funding: \$200,000.

“Joint Aerial Layer Network (JALN) Development of the Command and Control (C2) Measure of Effectiveness Development.” Sponsor: AFC2IC. Funding: \$308,000 – Ahner 50%, Weir 50%.

“Methods of Determining Best Mix Options for Directed and Kinetic Energy Weapons.” Sponsor: AFRL/RW. Funding: \$100,000.

“T-X Source Selection Methodology and Tool Description.” Sponsor: AFLCMC. Funding: \$40,000.

REFEREED JOURNAL PUBLICATIONS

Ahner D.K., 2013, “Scientific Test and Analysis Techniques (STAT) in Test and Evaluation (T&E) Center of Excellence (COE): Designing and Implementing Statistical Rigor into Test and Evaluation for the Department of Defense,” *ITEA Journal*, 199-201, Vol. 34 No. 2 Jun 2013.

Hackleman, A.S., Johnson, A.W., and Ahner, D.K., 2013, “Nuclear Enterprise Performance Measurement,” *Journal of Defense Modeling and Simulation*, published on-line 26 Mar 2013, DOI: 10.1177/1548512912445468.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Ahner, D.K., Gibson, S., Parson, C., and Weiblen, J., “Deployment Impacts on U.S. Air Force Junior Officer Retention: What Really Matters?” *Proceedings of the Western Decision Sciences Institute Conference, 2013*.

Ahner, D.K., Boehmke, B., Wynkoop, C., and Fryman, M., “The Effect of Using Semivariance for A Lead Time Demand Inventory Model,” *Proceedings of the Western Decision Sciences Institute Conference, 2013*.

Ahner, D.K., Parson, C., and Russell, B., “Operational Simulation, Modeling, and Analysis of Mission Planning at the 618th Tanker Airlift,” *Proceedings of the 2013 Industrial and Systems Engineering Research Conference (ISERC)*, A. Krishnamurthy and W.K.V. Chan, Eds.

Ahner, D.K., and Parson, C., “Optimal Methods for Interceptor Allocation in a Weapon-Target Assignment Framework,” *Proceedings of the 2013 Industrial and Systems Engineering Research Conference (ISERC)*, A. Krishnamurthy and W.K.V. Chan, Eds.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Morris, J.F., Deckro, R.F., Ahner, D.K., Bulutoglu, D.A., and Hamill, J.T., (2012) “DOE for Assessing Social Network Analysis Techniques,” *INFORMS Annual Meeting 2012*, Phoenix, AZ, Oct 2012.

Morris, J.F., Deckro, R.F., Ahner, D.K., Bulutoglu, D.A., and Hamill, J.T., (2012) “Statistical Analysis of Social Network Analysis Methodologies with Design of Experiments and Quantile Regression,” *The 29th International Military Operational Research Symposium*, Shirrell Heath, Southampton, UK, 2012.

ANDERSON, BRADLEY E., Lt Col, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Anderson, B.E., Blocher, J.D., Bretthauer, K.M., and Venkataramanan, M.A., 2013, “An Efficient Network-Based Formulation for Sequence Dependent Setup Scheduling on Parallel Identical Machines,” *Mathematical and Computer Modeling*, Vol. 57, Issues 3-4, Feb 2013, P.483-493.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Prevett, T., and Anderson, B.E., “Sealift or Airlift For Global Mobility,” published in the proceedings of the *National Decision Sciences Institute (DSI) Annual Meeting* in San Francisco, CA, Nov 2012.

BAUER, KENNETH W., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Steward, B.J., Bauer, K.W., and Perram, G.P., 2012, "Remote discrimination of large-caliber gun firing signatures," *The Journal of Applied Remote Sensing*, 6 (1), 063607 (Dec 05, 2012); doi: 10.1117/1.JRS.6.063607.

Johnson, R.J., Williams, J.P., Bauer, K.W., 2012, "AutoGAD: An Improved ICA-Based Hyperspectral Anomaly Detection Algorithm," *IEEE Transactions on Geoscience and Remote Sensing*, Vol.51, No.6, pp. 3492-3503, doi: 10.1109/TGRS.2012.2222418.

Williams, J.P., Bauer, K.W., and Friend, M.A., 2012, "Further Extensions to Robust Parameter Design: Three Factor Interactions with an Application to Hyperspectral Imagery," *International Journal of Quality engineering & Technology*, Vol. 3, No. 3 (2013) pp. 204 - 218.

Mindrup, F.M., Friend, M.A., Bauer, K.W., 2012, "Small sample training and test selection method for optimized anomaly detection algorithms in hyperspectral imagery," *The Journal of Applied Remote Sensing*, 0001; 6 (1):063563-1-063563-21.

Williams, J.P., Bauer, K.W., and Friend, M.A., 2012, "Clustering Hyperspectral Imagery for improved Adaptive Matched Filter Performance," *The Journal of Applied Remote Sensing*, 7 (1), 073547 (Jun 05, 2013); doi: 10.1117/1.JRS.7.073547.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Bihl, T., and Bauer, K.W., "Data Mining and Analyzing Basic Features of the State of the Union Addresses," *2013 MAA Ohio Chapter Meeting, Denison University*, Apr 5-6, 2013.

Situ, J., Bihl, T., Bauer, K.W., and Friend, M.A., "Combat Identification of Synthetic Aperture Radar Images using Contextual Features and Bayesian Belief Networks," *80th Military Operations Research Society Symposium*, United States Air Force Academy, 2012.

Friesen, K., Bihl, T., Bauer, K.W., Williams, J., and Friend, M.A., "Automatic Combat Identification and Out of Library Considerations for Hyperspectral Imagery," *80th Military Operations Research Society Symposium*, United States Air Force Academy, 2012.

CHRISSIS, JAMES W., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Herbranson, T.J., Deckro, R.F., Chrissis, J.W., and Hamill, J.T., 2012, "Considering the Isolation Set Problem," *European Journal of Operational Research*, <http://dx.doi.org/10.1016/j.ejor.2012.11.016>.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Parson, C., Chrissis, J.W., O'Hara, R., Palazotto, A.N., (2013) "Direct Search Optimization of a Flapping Micro Air Vehicle Wing," Presented at the 9th AIAA MDO Specialist Conference, Boston, MA, Apr 2013.

COCHRAN, JEFFERY K., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Dillenburg, S.P., Cochran, J.K., and Cammarano, V.R., 2013, "Supply Airdrop Collateral Damage Risk Estimation with the Bivariate Normal Distribution," *Socio-Economic Planning Sciences* Vol. 47, No. 1, pp. 9-19, Jan 2013.

CUNNINGHAM, WILLIAM A., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Brady, S., Cunningham, W., Teagan, S., 2012, "Civil Reserve Air Fleet: The Impact of 9/11/2001," *Journal of Transportation Law, Logistics and Policy*, Vol. 79, No.20, pp. 163-191. 2012.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Bell, J., Cunningham, W.A., Ehasz, R., "Cost Benefit Analysis of Avian Radar Systems," *Western Decisions Science Institute Annual Meeting*, Long Beach, CA. Mar 26-29, 2013.

DECKRO, RICHARD F., Department of Operational Sciences

SPONSOR FUNDED RESEARCH PROJECTS

"JWAC AFIT Interaction." Sponsor: JWAC. Funding: \$125,000 – Deckro 80%, Ahner 10%, Black 10%.

FRIEND, MARK A., Lt Col, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Williams, J.P., Bauer, K.W., and Friend, M.A., 2012, "Further Extensions to Robust Parameter Design: Three Factor Interactions with an Application to Hyperspectral Imagery," *International Journal of Quality Engineering & Technology*, Vol. 3, No. 3 (2013) pp. 204 - 218.

Mindrup, F.M., Friend, M.A., Bauer, K.W., 2012, "Small sample training and test selection method for optimized anomaly detection algorithms in hyperspectral imagery," *The Journal of Applied Remote Sensing*, 0001; 6 (1):063563-1-063563-21.

Williams, J.P., Bauer, K.W., and Friend, M.A., 2012, "Clustering Hyperspectral Imagery for Improved Adaptive Matched Filter Performance," *The Journal of Applied Remote Sensing*, 7 (1), 073547 (Jun 05, 2013); doi: 10.1117/1.JRS.7.073547.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Friesen, K., Bihl, T., Bauer, K.W., Williams, J., and Friend, M.A., "Automatic Combat Identification and Out of Library Considerations for Hyperspectral Imagery," *80th Military Operations Research Society Symposium*, United States Air Force Academy, 2012.

GEFFRE, JENNIFER L., Maj, Department of Operational Sciences

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Geffre, J., and Brown, D.E., 2013, "Quantitative Framework for Strategic Spatial Decisions," *Western Decision Science Institute*, Long Beach, CA, 27 Mar 2013.

HILL, RAYMOND R., Jr., Department of Operational Sciences

SPONSOR FUNDED RESEARCH PROJECTS

"Force Structure Analysis Tool Development." Sponsor: AF/A9. Funding: \$172,157 – Hill 40%, Johnson 60%.

"The Science of Test: Advanced Test and Evaluation in Support of the DOD Test and Evaluation Enterprise." Sponsor: OSD. Funding: \$683,871.

REFEREED JOURNAL PUBLICATIONS

- Storm, S., Hill, R.R., and Pignatiello, J.J., 2013, "A Response Surface Methodology for Modeling Time Series Response Data," *Quality and Reliability Engineering International*, Vol. 29, No. 5: 771-778. DOI: 10.1002/qre.1442.
- Chambal, S.P., Kitchen, J., Hill, R.R., and Gutman, A.J., 2013, "Acquisition and Testing, DT/OT Testing: The Need for Two-Parameter Requirements," *Quality and Reliability Engineering International*, Vol. 29, No. 5, pp: 691-697. DOI: 10.1002/qre.1419.
- Hardman, N., Colombi, J., Jacques, D., Hill, R.R., Miller, J., 2013, "Requirements Elicitation through Legacy Mishap Analysis," *AIAA Journal of Aerospace Computing, Information, and Communication*, Vol. 10, No. 3, 105-113.
- Heath, B., Ciarallo, F., and Hill, R.R., 2012, "Validation in the Agent-Based Modeling Paradigm: Problems and a Solution," *International Journal of Simulation and Process Modeling*, Vol. 7, No. 4, 229-239.
- Hill, R.R., 2012, "T&E Workforce Development-Do Not Forget Education," *International Test and Evaluation Journal*, Vol. 33, No. 4, 333-338.
- Garza, R., Hill, R.R., and Mattioda, D.D., 2013, "Using Simulation to Analyze the Maintenance Architecture for an Air Force Weapon System," *Simulation: Transactions of the Society for Modeling and Simulation International*, 89(3): 294-305, DOI:10.1177/0037549712461382.
- Hiremath, C. and Hill, R.R., 2013, "First-Level Tabu Search Approach for Solving the Multiple-Choice Multidimensional Knapsack Problem," *International Journal of Metaheuristics*, Vol. 2, No. 2, 174-199.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

- Bova, M., Ciarallo, F., and Hill, R.R., "A Prototype Model of Fire Ignition from Ballistic Impacts," *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico.
- Gutman, A.T., White, E., and Hill, R.R., "Large Screening Experiments: An Overview of Supersaturated Designs for Practitioners," *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico.
- Leiter, M., Miller, J.O., and Hill, R.R., "Impact of Manpower Reduction at the Tanker Airlift Control Center," *Proceedings of the 2013 Industrial and Systems Engineering Research Conference*, San Juan, Puerto Rico.

JOHNSON, ALAN W., Department of Operational Sciences

SPONSOR FUNDED RESEARCH PROJECTS

- "Research, Analysis and Transition Support to the Directorate of Logistics and Sustainment Air Force Sustainment Center." Sponsor: AFSC. Funding: \$440,000.

REFEREED JOURNAL PUBLICATIONS

- Hackleman, A.S., Johnson, A.W., and Ahner, D.K., 2013, "Nuclear Enterprise Performance Measurement" *Journal of Defense Modeling and Simulation*, published on-line 26 Mar 2013, DOI: 10.1177/1548512912445468.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

- Breitbach, T., Johnson, A., Weir, J., and Brown, G., "Afghanistan Air Cargo Routing – A Systems Approach." *Proceedings of the IIE Industrial and Systems Engineering Research Conference, San Juan, Puerto Rico*, 18-22 May 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Schultz, K L., Johnson, A.W., and Rabon, R., (2013) "Success and Failure of Continuous Process Improvement Teams in the Same Organization," INFORMS Annual Conference.

MATTIODA, DANIEL D., Lt Col, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Garza, R., Hill, R.R., and Mattioda, D.D., 2013, "Using Simulation to Analyze the Maintenance Architecture for an Air Force Weapon System," *Simulation: Transactions of the Society for Modeling and Simulation International*, Vol. 89, No. 3, pp. 294-305, 2013.

Lynch, S., Heminger, A.R., and Mattioda, D.D., 2013, "Tanker Acquisition: A Systems Engineering Perspective," *Air and Space Power Journal*, Vol. 27. No. 3, pp. 83-91.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Williams, D., Miller, J.O., and Mattioda, D. D., (2013), "Simulation and Analysis of EXPRESS Run Frequency," Winter Simulation Conference, 8-11 Dec 2013, Washington DC.

MILLER, JOHN O., Department of Operational Sciences

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Leiter, M., Miller, J.O., Hill, R.R., "Impact of Manpower Reductions at the Tanker Airlift Control Center," *Proceedings of the 2013 Industrial Engineering Research Conference*, pp. 2128-2137, San Juan, Puerto Rico, 18-22 May 2013.

OGDEN, JEFFERY A., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Brewer, B., Ashenbaum, B., and Ogden, J.A., 2013, "Connecting strategy-linked outsourcing approaches and expected performance," *International Journal of Physical Distribution and Logistics Management*, Vol. 43, No. 3, 176-204.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Rubino, D. P., Ogden, J.A. and Hartman, P.L., (2013), "Insourcing within the U.S. Department of Defense: Critical Success Factors Impacting the Purchasing Function and Public/Private Partnerships," 23rd Annual North American Research and Teaching Symposium, Arizona, Mar 2013.

OVERSTREET, ROBERT E., Maj, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Overstreet, R.E., Hazen, B.T., Byrd, T.A., & Hall, D.J. (2013). "Innovativeness in the Motor Carrier Industry." *International Journal of Logistics: Research and Applications*, Vol. 16, No. 5, 367–379.

Overstreet, R.E., Hanna, J.B., Byrd, T.A., Cegielski, C.G., and Hazen, B.T., 2013, "Leadership style and organizational innovativeness drive motor carriers toward sustained performance," *International Journal of Logistics Management*, 24.1.

Overstreet, R.E., Hall, D.J., and Cegielski, C.G., 2013, "Predictors of the intent to adopt preventive innovations: A meta-analysis," *Journal of Applied Social Psychology*, 43(5), 936–946.

PIGNATIELLO, JOSEPH J., Jr., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Storm, S., Hill, R.R., and Pignatiello, J.J., 2013, "A Response Surface Methodology for Modeling Time Series Response Data," *Quality and Reliability Engineering International*, Vol. 29, No. 5: 771-778. DOI: 10.1002/qre.1442.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

McGinnity, K., Chicken, E., and Pignatiello, J.J., Jr., "Distribution-Free Changepoint Detection for Nonlinear Profiles," *Proceedings of the Industrial and System Engineering Research Conference*, San Juan, PR, May 18-22, 2013.

Girimurugan, S.B., Chicken, E., and Pignatiello, J.J., Jr., "Wavelet ANOVA for Detection of Local and Global Profile Changes," *Proceedings of the Industrial and System Engineering Research Conference*, San Juan, PR, May 18-22, 2013.

Becvarik, R., Chicken, E., Pignatiello, J.J., Jr., and Zeisset, M.S., "Alternative Upper Control Limit Methods for Change Point Detection," *Proceedings of the Industrial and System Engineering Research Conference*, San Juan, PR, May 18-22, 2013.

Cuevas, Jordan, Chicken, Eric, Girimurugan, Senthil Balaji and Pignatiello, Joseph J., Jr., "Semiparametric Changepoint Monitoring of Profile Data," *Proceedings of the Industrial and System Engineering Research Conference*, San Juan, PR, May 18-22, 2013.

ROBBINS, MATTHEW J., Maj, Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Jacobson, S.H., King, D.M., Ryan, K.C., and Robbins, M.J., 2012, "Assessing the Long Term Benefit of Banning the Use of Hand-Held Wireless Devices While Driving," *Transportation Research Part A: Policy and Practice*, 46 (10), 1586-1593.

CONFERENCE PRESENTATIONS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Guzman, J.D., Deckro, R.F., Robbins, M.J., Morris, J.F., and Ballester, N.A., (2013) "An Analysis of Some Social Network Measures," *Military Operations Research Society Symposium 81.1*, presented via DCO, 14 Jun 2013.

SCHULTZ, KENNETH L., Department of Operational Sciences

REFEREED JOURNAL PUBLICATIONS

Croson, R., Schultz, K.L., Siemsen, E., and Yao, L., 2013, "Behavioral Operation, The State of the Field," *Journal of Operations Management*, V31, #1, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Schultz, K L., Johnson, A.W., and Rabon, R., (2013) "Success and Failure of Continuous Process Improvement Teams in the Same Organization," *INFORMS Annual Conference*.

STRAKOS, JOSHUA K., Maj, Department of Operational Sciences

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Strakos, J. K., Chin, W. W., “Effective Planning and Improvisation in Disaster Relief Supply Chain Management.” *Proceedings of the 43rd Annual Meeting of the Decision Sciences Institute, San Francisco: Decision Sciences Institute, San Francisco, CA, 2012.*

WEIR, JEFFERY D., Department of Operational Sciences

SPONSOR FUNDED RESEARCH PROJECTS

“AFRL Strategic Analysis of Lab Infrastructure.” Sponsor: AFRL. Funding: \$450,240.

“ASC Prioritization.” Sponsor: AFMC. Funding: \$263,868.

“JDPAC and AFIT Distribution Research Proposal.” Sponsor: USTRANSCOM. Funding: \$125,000.

“Secretary of the Air Force Inspector General USAF Inspections Support (SAF/IGI Support).” Sponsor: SAF. Funding: \$20,000.

REFEREED JOURNAL PUBLICATIONS

Hu, M., Wu, T., and Weir, J.D., 2012, “An intelligent augmentation of particle swarm optimization with multiple adaptive methods,” *Information Sciences Volume 213*, 5 Dec 2012, Pages 68–83.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

S. R. Soni, M. Al-Romaihi, J. R. Wirthlin, A. B. Badiru, J. D. Weir, “Analysis of Z-Pinned Laminated Composites Fatigue Test Data,” *International Conference on Agile Manufacturing Systems, ICAM-2012*, Institute of Technology, Banaras Hindu University, Varanasi-221005.

Johnson, A., Breitbach, T, Weir, J.D., and Brown, G., “Afghanistan Air Cargo Routing – A Systems Approach,” *Industrial and Systems Engineering Research Conference*, May 2013, San Juan, Puerto Rico.

6.5. CENTER FOR SPACE RESEARCH AND ASSURANCE

Center for Space Research and Assurance (CSRA)

Director 255-3636 x4578

Deputy Director 255-3636 x4542

Director of Research 255-3636 x4901

Homepage: <http://www.afit.edu/en/CSRA>

6.5.1. MASTER'S THESES

BASTOW, LANDON B., *Modeling the Impact of the Payload Alert Communications System (PACS) on the Accuracy of Conjunction Analysis*. AFIT/ENV/13M-01. Faculty Advisor: Dr. Michael R. Grimaila. Sponsor: AFRL/RV.

BIRGE, CHRISTOPHER A., *Hardware Design, Integration, and Test for the ALICE CubeSat Mission*. AFIT/ENY/13M-01. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: N/A.

BLUNCK, KACEY E., *Space Telescope Structural Design Analysis Approaches for the Chromotomographic Hyperspectral Imaging Experiment*. AFIT/ENY/13M-02. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: N/A.

CLAYBROOK, JOHN R., *Feasibility Analysis on the Utilization of the Iridium Satellite Communications Network for Resident Space Objects in Low Earth Orbit*. AFIT/ENY/13M-04. Faculty Advisor: Dr. William E. Wiesel. Sponsor: AFRL/RV.

COON, TIMOTHY E., *Opto-Mechanical Design of a Chromotomographic Imager Direct-Vision Prism Element*. AFIT/ENY/13M-07. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: N/A.

EATON, ADRIANNA J., *Vibrational Analysis and Characterization of a Space-Based Deployable Photon Sieve System*. AFIT/ENY/13M-12. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: USAFA.

INGRAHAM, STEVEN P., *Dynamic Constellation Tasking and Management*. AFIT/ENY/13M-18. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: ORSO.

JOHNSON, SAMUEL C., *Design of a Control Moment Gyroscope Attitude Actuation System for the Attitude Control Subsystem Proving Ground*. AFIT/ENY/13M-19. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV.

MOORE, BRIAN P., *Development, Integration, and Test of the ALICE CubeSat*. AFIT/ENY/13M-24. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A.

NASTASI, KEVIN M., *Maneuverability Analysis against a Counterspace Mission Architecture*. AFIT/ENY/13M-25. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: ORSO.

NEWMAN, REX H., *Analysis and Validation of a CubeSat-Class Solar Array and Battery Module*. AFIT/ENY/13M-26. Faculty Advisor: Dr. Eric D. Swenson. Sponsor: AFRL/RV.

POHL, KEVIN J., *Ground System Development - Enhancing AFIT Capabilities and Joining the MC3 Network*. AFIT/ENY/13M-38. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A.

RUYLE, DOUGLAS B., *Automated Improved Satellite Detection by Doppler Shifted Signals Off of the Air Force Space Surveillance System*. AFIT/ENY/13M-30. Faculty Advisor: Dr. Richard G. Cobb. Sponsor: N/A.

SALES, JAMES W., *Trajectory Optimization for Spacecraft Collision Avoidance*. AFIT/ENY/13S-01.
Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A.

SCHUDROWITZ, CHRISTINE M., *The Effects of Observations and Maneuvers on Orbit Solutions*. AFIT/
ENY/12D-01DL. Faculty Advisor: Dr. Jonathan T. Black. Sponsor: N/A.

VINESKI, CHRISTOPHER D., *Experimental Analysis of Dampened Breathing Mode Oscillation on Hall
Effect Thruster Performance*. AFIT/ENY/13M-39. Faculty Advisor: Capt David Liu. Sponsor: AFRL/RQ.

WOLF, ERIC T., *Porous Emitter Colloid Thruster Performance Characterization Using Optical Techniques*.
AFIT/ENY/13M-36. Faculty Advisor: Capt David Liu. Sponsor: AFRL/RQ.

6.5.2. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BLACK, JONATHAN T., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

“AFIT Space Research in Support of SMC/SY.” Sponsor: SMC. Funding: \$34,999 – Black 40%, Lawrence
10%, Swenson 25%, H Hopkinson 25%.

“AFIT USSTRATCOM.” Sponsor: USSTRATCOM. Funding: \$100,000 – Black 50%, Jennings 25%,
Simmons 25%.

“Imaging Chromotomographic Spectrometer Experiment (CTEx).” Sponsor: AS&T. Funding: \$50,000 –
Black 34%, Cobb 33%, Swenson 33%.

“Imaging Chromotomographic Spectrometer Experiment (CTEx).” Sponsor: AS&T. Funding: \$55,000 –
Black 40%, Cobb 30%, Swenson 30%.

“New Orbital Regimes for Flexible Collection and Reduced Vulnerability.” Sponsor: AS&T. Funding:
\$25,000.

“New Structural Concepts for Very Large Antennas.” Sponsor: N/A. Funding: \$75,000 – Black 50%,
Jennings 50%.

“Program Analyst for Integrated Air and Missile Defense.” Sponsor: MDA. Funding: \$150,000.

REFEREED JOURNAL PUBLICATIONS

Jennings, A.L., Black, J., Allen, C., “Empirical Bounding of Space Booms with Tape Spring Hinges,” *Shock
and Vibration*, Vol. 20, No. 3, May – Jun 2013, pp. 503-517, DOI: 10.3233/SAV-130764.

Co, T.C., Zagaris, C., Black, J.T., “Responsive Satellites through Ground Track Manipulation using Existing
Technology,” *Journal of Spacecraft and Rockets*, Vol. 50, No. 1, Jan. – Feb 2013, pp. 206-216, DOI:
10.2514/1.62192.

Yates, J.M., Spanbauer, B.W., Black, J.T., “Geostationary Orbit Development and Evaluation for Space
Situational Awareness,” *Acta Astronautica*, Vol. 81, Iss. 1 Dec. 2012, pp. 256-272, DOI:
10.1016/j.actaastro.2012.05.011.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Jennings, A.L., Black, J.T., Gutierrez, A.N., “Geometry and Moments of Bent Tape Springs,” 54th
AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Boston, MA,
Apr. 2013, DOI: 10.2514/6.2013-1669.

Co, T.C., Black, J.T., "Responsiveness in Low Orbits using Electric Propulsion," 2012 AIAA Guidance, Navigation, and Control Conference, Minneapolis, MN, Aug. 2012, AIAA Paper 2012-4918.

Blackstun, M., Swenson, E., Hart, S., Black, J., Cobb, R., "Design, Build, and Test of Engineering Development Spacecraft Hardware in a Satellite Design Course at the Air Force Institute of Technology," American Society of Engineering Education International Forum 2012, Jun 2012.

Blunck, K., Coon, T.E., Swenson, E., Black, J., Cobb, R., "Space Telescope Structural Design Analysis for the Chromotomographic Hyperspectral Imaging Experiment," 54th AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics and Materials Conference, Boston, MA, Apr. 2013, DOI: 10.2514/6.2013-1827.

COBB, RICHARD G., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

"GEO Space Situational Awareness." Sponsor: AFRL/RV. Funding: \$80,000 – Cobb 34%, Wiesel 33%, Simmons 33%.

JENNINGS, ALAN L., Department of Aeronautics and Astronautics

REFEREED JOURNAL PUBLICATIONS

A. Jennings, J. Black and C. Allen, "Empirically Bounding of Space Booms with Tape Spring Hinges," Shock and Vibration, Vol. 20, No. 3, pp. 503-517, May 2013. DOI: 10.3233/SAV-130764.

Jennings, A.L., Cobb, R., "Ambient Vibration Testing of a Segmented Mirror Telescope," AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 11-Aug-2013, DOI: 10.2514/6.2013-1884.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Jennings, A.L., Black, J., Gutierrez, A.N., "Geometry and Moments of Bent Tape Springs," AIAA/ASME/ASCE/AHS/ASC Structures, Structural Dynamics, and Materials Conference, 9-Aug-2013, DOI: 10.2514/6.2013-1669.

LIU, DAVID, Capt, Department of Aeronautics and Astronautics

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Vineski, C. D., Liu, D., Hargus, W. A., "Experimental Analysis of Dampened Breathing Mode Oscillations on Hall Thruster Performance," 60th JANNAF Propulsion Meeting/19th Modeling and Simulation/7th Liquid Propulsion/6thSpacecraft Propulsion Meeting/Joint Subcommittee Meeting, Colorado Springs, CO, 29 Apr - 2 May 2013.

SWENSON, ERIC D., Department of Aeronautics and Astronautics

SPONSOR FUNDED RESEARCH PROJECTS

"AFRL/RV-AFIT 2012 MOA Research." Sponsor: AFRL/RV. Funding: \$125,000 – Swenson 25%, Cobb 25%, Black 25%, Wiesel 25%.

"Optimal Targeting Maneuvers." Sponsor: N/A. Funding: \$65,000 – Swenson 34%, Cobb 33%, Simmons 33%.

"Peregrine: Deployable Photon Sieve." Sponsor: DARPA. Funding: \$171,041 – Swenson 40%, Black 25%, Cobb 25%, Rutledge 10%.

6.6. CENTER FOR TECHNICAL INTELLIGENCE STUDIES AND RESEARCH

Center for Technical Intelligence Studies and Research (CTISR)

Director 255-3636 x4547

Executive Program Coordinator 255-7287

FAX 656-6000

Homepage: <http://www.afit.edu/en/CTISR>

6.6.1. DOCTORAL DISSERTATIONS

BOSTICK, RANDALL L., *Development and Characterization of a Chromotomosynthetic Hyperspectral Imaging System*. AFIT/ENP/DS/13M-02. Faculty Advisor: Dr. Glen P. Perram. Sponsor: NASIC.

6.6.2. MASTER'S THESES

BARKI, ANUM, *An Inverse Kinematic Approach Using Groebner Basis Theory Applied to Gait Cycle Analysis*. AFIT/ENP/13M-02. Faculty Advisor: Dr. Ronald F. Tuttle. Sponsor: NRL.

CARLSON, EVAN J., *Development of a Spectropolarimetric Capability*. AFIT/ENP/13M-05. Faculty Advisor: Dr. Kevin C. Gross. Sponsor: DTRA.

JACOB, MARTIN A., *Passive Ranging Using a Dispersive Spectrometer and Optical Filters*. AFIT/ENP/12D-02. Faculty Advisor: Dr. Michael R. Hawks. Sponsor: NASIC.

KEITH, ALANNA, *Discrimination of Neutral Postures in Computer Based Work*. AFIT/ENP/13M-19. Faculty Advisor: Dr. Amy L. Magnus. Sponsor: AFOSR.

KEITH, STEPHANIE R., *Discrimination between Child and Adult Forms Using Radar Frequency Signature Analysis*. AFIT/ENP/13M-20. Faculty Advisor: Dr. Amy L. Magnus. Sponsor: AFRL/RV.

6.6.3. FACULTY RESEARCH OUTPUT

Notes: Faculty Bios can be found under their respective department listings. Shared credit for funding awards is indicated by the percentages shown for each faculty member associated with the project.

BOREL-DONOHUE, CHRISTOPH C., Department of Engineering Physics

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Borel-Donohue, C.C., Bunker, D.J., Tuttle, R.F., Barki, A.N. and Gilbreath, G.C., "Multimodal Gait Signatures and Motion Studies," 2012 Joint Meeting of the Military Sensing Symposia (MSS) Specialty Group On "Advanced Signatures Technology Symposium (ASTS)," MSS-JOINT-12-041, Paper B104 (Oct, 2012).

Kendricks, K., Barki, A.N., Tuttle, R.F., Bunker, D.J., Borel-Donohue, C.C., "An inverse-kinematic approach using Groebner basis theory applied to gait cycle analysis," Proceedings of the SPIE Defense, Security and Sensing Symposium,. Vol. 8734, Paper 8734-22 (2013).

BUNKER, DAVID J., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

"Overhead Persistent Infra-Red (OPIR) R&D." Sponsor: NGA. Funding: \$750,000 – Bunker 50%, Borel-Donohue 40%, Tuttle 5%, Walli 5%.

"Rapid Location of Radiation Sources in Complex Environments Using Optical and Radiation Sensors." Sponsor: DTRA. Funding: \$68,271 – Bunker 25%, Borel-Donohue 50%, Magnus 15%, Tuttle 10%.

“Trajectory Prediction Code Assessment.” Sponsor: NASIC. Funding: \$15,530.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Borel-Donohue, C.C., Bunker, D.J., Tuttle, R.F., Barki, A.N. and Gilbreath, G.C., “Multimodal Gait Signatures and Motion Studies,” 2012 Joint Meeting of the Military Sensing Symposia (MSS) Specialty Group On “Advanced Signatures Technology Symposium (ASTS),” MSS-JOINT-12-041, Paper B104 (Oct, 2012).

Kendricks, K., Barki, A.N., Tuttle, R.F., Bunker, D.J., Borel-Donohue, C.C., “An inverse-kinematic approach using Groebner basis theory applied to gait cycle analysis,” Proceedings of the SPIE Defense, Security and Sensing Symposium,. Vol. 8734, Paper 8734-22 (2013).

GROSS, KEVIN C., Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

“NASIC Ground Truth Support.” Sponsor: NASIC. Funding: \$147,649.

“Polarimetric Hyperspectral Imagery of Disturbed Earth.” Sponsor: ERDC. Funding: \$250,218.

REFEREED JOURNAL PUBLICATIONS

J. Motos Gordon, Kevin C. Gross, and Glen P. Perram. “Fireball and Shock Wave Dynamics in the Detonation of Aluminized Novel Munitions,” *Combustion, Explosion, and Shock Waves*, Vol. 49, pp. 450–462 (2013). <http://dx.doi.org/10.1134/S0010508213040084>; Published Jul 2013.

Michael R. Rhoby, Jacob L. Harley, Kevin C. Gross, Pierre Tremblay, Martin Chamberland. “Imaging Fourier-Transform Spectrometry for Plume Diagnostics and Code Validation,” *International Journal of Energetic Materials and Chemical Propulsion*, Vol. 12, No. 1, pp. 15–26 (2013).

HAWKS, MICHAEL R., Department of Engineering Physics

REFEREED JOURNAL PUBLICATIONS

M.R. Hawks, R.A. Vincent, J. Martin, and G.P. Perram, "Short-range demonstrations of molecular passive ranging using O₂(X-b) absorption spectra." *Applied Spectroscopy*, Vol. 67, pp. 513-519 (2013).

PERRAM, GLEN P., Department of Engineering Physics

REFERRED JOURNAL PUBLICATIONS:

J. Motos Gordon, Kevin C. Gross, Glen P. Perram, “Fireball and shock wave dynamics in the detonation of aluminized novel munitions,” *Combustion, Explosion, and Shock Waves*, Vol. 49, pp. 450-462 (Jul 2013).

Michael R. Hawks, R. Anthony Vincent, Jacob Martin, and Glen P. Perram, "Short-range demonstrations of monocular passive ranging using O₂(X-b) absorption spectra," *Applied Spectroscopy*, Vol. 67, pp. 513–519 (May 2013).

Bryan J. Steward, Kenneth B. Bauer, and Glen P. Perram “Remote discrimination of large caliber gun firing signatures,” *Journal of Applied Remote Sensing*, Vol. 6, Article No. 063607 (Dec 2012).

Randall L. Bostick and Glen P. Perram "Hyperspectral image reconstruction of an array of extended targets using chromotomosynthesis," *Optical Engineering*, Vol. 51, Article No. 103205 (Oct 2012).

Randall L. Bostick and Glen P. Perram “Classification of visible point sources using hyperspectral chromotomosynthetic imagery,” *Journal of Applied Remote Sensing*, 6(1), Article No. 063584-1 (Oct 2012).

TUTTLE, RONALD F., Department of Engineering Physics

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Borel-Donohue, C.C., Bunker, D.J., Tuttle, R.F., Barki, A.N. and Gilbreath, G.C., “Multimodal Gait Signatures and Motion Studies,” 2012 Joint Meeting of the Military Sensing Symposia (MSS) Specialty Group On “Advanced Signatures Technology Symposium (ASTS),” MSS-JOINT-12-041, Paper B104 (Oct, 2012).

Kendricks, K., Barki, A.N., Tuttle, R.F., Bunker, D.J., Borel-Donohue, C.C., “An inverse-kinematic approach using Groebner basis theory applied to gait cycle analysis,” *Proceedings of the SPIE Defense, Security and Sensing Symposium*, Vol. 8734, Paper 8734-22 (2013).

WALLI, KARL C., Lt Col, Department of Engineering Physics

SPONSOR FUNDED RESEARCH PROJECTS

“Physics Based NUDET Modeling.” Sponsor: NNSA. Funding: \$25,000 – Walli 75%, Bunker 25.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

J.M. Ekholm, K.C. Walli, and J.D. Hendrix, “Optimizing Computer Vision-based Scene Reconstruction from Aerial Vehicles,” *Proceedings of the Applied Imagery Pattern Recognition Workshop* (AIPR), 2012 IEEE (Oct 2012).

R.N. Givens, K.C. Walli, M.T. Eismann, “Fusion of LIDAR data with hyperspectral and high-resolution imagery for automation of DIRSIG scene generation,” *Proceedings of the Applied Imagery Pattern Recognition Workshop* (AIPR), 2012 IEEE (Oct 2012).

J.C. Florio, K.C. Walli, J.A. Jackson, M. Gartley, “Comparison of DIRSIG-Simulated Synthetic Aperture Radar Scattering with Parametric Models and Measured Data,” *Proceedings of the Applied Imagery Pattern Recognition Workshop* (AIPR), 2012 IEEE (Oct 2012).

7. TECHNOLOGY TRANSFER

7.1. COOPERATIVE RESEARCH AND DEVELOPMENT AGREEMENTS

- “Ablative Thermal Protection Systems,” USAF CRADA 13-AFIT-01, Collaborator: The University of Queensland, Faculty Investigator: Dr. Robert Greendyke, Effective Date: 16 November 2012, Term: 36 months.
- “Assessment of Advanced Attitude Display,” USAF CRADA 13-AFIT-13, Collaborator: Pilot Disorientation Prevention Technologies LLC, Faculty Investigator: Dr. Michael Miller, Effective Date: 6 September 2013, Term: 14 months.
- “Commercialization of Cyber-Systems,” USAF CRADA 13-AFIT-07, Collaborator: Sciences Applications International Corp, Faculty Investigator: Dr. Rusty Baldwin, Effective Date: 4 March 2013, Term: 12 months.
- “Correlator Beam Forming for GPS Signals,” USAF CRADA 13-AFIT-06, Collaborator: Locata Corporation, Faculty Investigator: Dr. John Raquet, Effective Date: 6 March 2013, Term: 48 months.
- “Cyber Metrics and Multilevel Security Systems,” USAF CRADA 13-AFIT-09, Collaborator: Johns Hopkins University Applied Physics Laboratory, Faculty Investigator: Dr. Rusty Baldwin, Effective Date: 17 May 2013, Term: 12 months.
- “Cyber Security and Knowledge Engineering Research,” USAF CRADA 13-AFIT-12, Collaborator: Riverside Research, Faculty Investigator: Dr. Robert Mills, Effective Date: 7 June 2013, Term: 12 months.
- “Cybertap Technologies,” USAF CRADA 13-AFIT-03, Collaborator: Cybertap LLC, Faculty Investigator: Dr. Rusty Baldwin, Effective Date: 23 February 2013, Term: 12 months.
- “Facilitation of Graduate Research Development Program,” USAF CRADA 13-AFIT-14, Collaborator: Dayton Area Graduate Studies Institute, Faculty Investigator: Dr. Heidi Ries, Effective Date: 28 August 2013, Term: 18 months.
- “Light Emitting Diode (LED) Ultra-Violet (UV) Disinfection of Water,” USAF CRADA 13-AFIT-05, Collaborator: University of Cincinnati ERC, Faculty Investigator: Maj LeeAnn Raczy, Effective Date: 17 January 2013, Term: 9 months.
- “Novel Laser-Based Diagnostics for Quantitative Characterization of Burning in the Turbine Phenomenon for SBIR Phase II for Topic No. AF103-200,” USAF CRADA 13-AFIT-02, Collaborator: Spectral Energies LLC, Faculty Investigator: Dr. Marc Polanka, Effective Date: 10 December 2012, Term: 30 months.
- “Rubidium Vapor Circulation System and High Energy Laser Analysis Tool,” USAF CRADA 13-AFIT-11, Collaborator: Creare Inc, Faculty Investigator: Dr. Glen Perram, Effective Date: 5 June 2013, Term: 15 months.
- “Security Issues in Cyber-Physical Systems (CPS),” USAF CRADA 13-AFIT-10, Collaborator: The Design Knowledge Company, Faculty Investigator: Dr. Barry Mullins, Effective Date: 22 April 2013, Term: 12 months.
- “Trustworthy Computing and Security,” USAF CRADA 13-AFIT-04, Collaborator: Tenet 3 LLC, Faculty Investigator: Dr. Rusty Baldwin, Effective Date: 6 March 2013, Term: 12 months.

APPENDICES

APPENDIX A: POST-DOCTORAL AND OTHER RESEARCH ASSOCIATES' CREDENTIALS

AZGHANDI, SEIF, Research Associate, Department of Electrical and Computer Engineering, AFIT Appointment Date: 2012 (AFIT/ENG), BSCS, University of Illinois at Chicago, 1989, MSCS, University of Colorado at Denver, 2006, PhD candidate, Denver University, ABD (in progress). His research interests include testing/regression testing, data mining, parallel processing, and wireless networking (cognitive radio), cloud computing, and security. Seif Azghandi is a member of the IEEE. Tel. 937-255-6565 x6148 (DSN 785-6565 x6148), email: sazghand@afit.edu

BASU, SANTASRI, Post-Doctoral Research Associate, Department of Engineering Physics, AFIT Appointment Date: 2011 (AFIT/ENP); BS, Electrical Engineering, Jadavpur University, India, 2000; MS, Electrical Engineering, New Mexico State University, 2005; PhD, Electrical Engineering, New Mexico State University, 2008. Dr. Basu is working on modeling scattering from rough surfaces and laser beam propagation. Tel. 937-255-6565 x4903, email: Santasri.Basu.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

S. Basu, M. W. Hyde, S. J. Cusumano, M. A. Marciniak and S. T. Fiorino, "Examining the validity of using a Gaussian Schell-model source to model the scattering of a fully coherent Gaussian beam from a rough impedance surface," *Optical Engineering*, Vol. 52(3), Article No. 038001 (2013).

M. Hyde, S. Basu, M. Spencer, S. Cusumano, and S. Fiorino, "Physical optics solution for the scattering of a partially-coherent wave from a statistically rough material surface," *Optics Express*, Vol. 21, pp. 6807-6825 (2013).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Santasri Basu, Milo W. Hyde, Jack E. McCrae, Jr., and Steven T. Fiorino, "Scattering from a rough surface in presence of atmospheric turbulence," *Proceedings of the SPIE*, Vol. 8732, Paper No. 87320G (2013).

Milo W. Hyde, Santasri Basu, Salvatore J. Cusumano and Mark F. Spencer, "Scalar wave solution for the scattering of a partially coherent beam from a statistically rough metallic surface," *Proceedings of the SPIE*, Vol. 8550, Paper No. 85503A (2012).

BRANT, ADAM T., National Research Council Post-Doctoral Fellow, AFIT Appointment Date: 2012 (AFIT/ENP); BS, Physics, Slippery Rock University, 2007; PhD, Physics, West Virginia University, 2011. Dr. Brant's work is focused on point defect identification in materials using electron paramagnetic resonance; materials of interest include wide-bandgap radiation detector crystals, oxides for energy production, and photorefractive materials for optical sensing and detection systems. Tel. 937-255-3636 x4741. Email: Adam.Brant.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

A. T. Brant, N. C. Giles, Shan Yang, M. A. R. Sarker, S. Watauchi, M. Nagao, I. Tanaka, D. A. Tryk, A. Manivannan, and L. E. Halliburton, "Ground state of the singly ionized oxygen vacancy in rutile TiO₂," *Journal of Applied Physics* Vol. 114, Article No. 113702/1-10 (Sep 2013).

A. T. Brant, D. A. Buchanan, J. W. McClory, P. A. Dowben, V. T. Adamiv, Ya. V. Burak, and L. E. Halliburton, "EPR identification of defects responsible for thermoluminescence in Cu-doped lithium tetraborate (Li₂B₄O₇) crystals," *Journal of Luminescence*, Vol. 139, pp 125-131 (Jul 2013).

T. D. Kelly, L. Kong, D. A. Buchanan, A. T. Brant, J. C. Petrosky, J. W. McClory, V. T. Adamiv, Y. V. Burak, and P. A. Dowben, “EXAFS and EPR analysis of the local structure of Mn-doped $\text{Li}_2\text{B}_4\text{O}_7$,” *Physica Status Solidi (b)*, Vol. 250, Issue 7, pp 1376-1383 (Jul 2013).

A.T. Brant, L.E. Halliburton, N.C. Giles, S.A. Basun, A.A. Grabar, and D.R. Evans. “Intrinsic small polarons (Sn^{3+} ions) in photorefractive $\text{Sn}_2\text{P}_2\text{S}_6$ crystals,” *Journal of Physics: Condensed Matter* Vol. 25, Article No. 205501/1-5 (May 2013).

Shan Yang, A.T. Brant, N.C. Giles, and L.E. Halliburton, “Intrinsic small polarons in rutile TiO_2 crystals,” *Physical Review B* Vol. 87, Article No. 125201/1-6 (Mar 2013).

A.T. Brant, N.C. Giles, and L.E. Halliburton, “Insertion of lithium ions into TiO_2 (rutile) crystals: an EPR study of the Li-associated Ti^{3+} small polaron,” *Journal of Applied Physics* Vol. 113, Article No. 053712/1-6 (Feb 2013).

A.T. Brant, L.E. Halliburton, S.A. Basun, A.A. Grabar, S.G. Odoulov, A. Shumelyuk, N.C. Giles, and D.R. Evans, “Photoinduced EPR study of Sb^{2+} ions in photorefractive $\text{Sn}_2\text{P}_2\text{S}_6$ crystals,” *Physical Review B* Vol. 86, Article No. 134109/1-6 (Oct 2012).

FRANCIS, SARAH A., Post-Doctoral Research Associate, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, Electrical Engineering, Western Kentucky University, 2006; MS, Electrical Engineering, Vanderbilt University, 2008; PhD, Electrical Engineering, Vanderbilt University, 2011. Dr. Francis’ research is focused on semiconductor device physics, semiconductor performance and reliability analysis, and effects of radiation. Tel. 937-255-3636 x4698, email: Sarah.Francis.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

C. X. Zhang, X. Shen, E. X. Zhang, D. M. Fleetwood, R. D. Schrimpf, S. A. Francis, T. Roy, S. Dhar, S.-H. Ryu, and S. T. Pantelides, “Temperature dependence and postirradiation annealing response of the $1/f$ noise of 4H-SiC MOSFETs,” *IEEE Transactions on Electron Devices*, Vol. 60, pp. 2361–2367 (Jul 2013).

KANEL, SUSHIL R., National Research Council Post-Doctoral Fellow, AFIT Appointment Date: 2010 (AFIT/ENV); BE, Civil Engineering, Tribhuvan University (Nepal), 1992; MS, Environmental Science and Engineering, Gwangju Institute of Science and Technology (South Korea), 2001; PhD, Environmental Science and Engineering, Gwangju Institute of Science and Technology (South Korea), 2006. Dr. Kanel’s work is focused on the fate and transport of nanomaterials in the subsurface, as well as the application of nanomaterials for water remediation. Tel. 937-255-3636 x4568 (DSN 785-3636 x4568), email: Sushil.Kanel.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

Flory, J., S.R. Kanel, L. Racz, C.A. Impellitteri, R.G. Silva, and M.N. Goltz, Influence of pH on the Transport of Silver Nanoparticles in Saturated Porous Media: Laboratory Experiments and Modeling, *Journal of Nanoparticle Research*, 15:1484, 2013. [Note that 1484 is the article number; pages aren’t numbered; paper has 11 pages].

Swarnakara, P., S.R. Kanel, D. Nepal, Y. Jiang, H. Jia, L. Kerr, M.N. Goltz, J. Levy, J. Rakovan, Silver Deposited Titanium Dioxide Thin Film for Photocatalysis of Organic Compounds Using Natural Light, *Solar Energy*, 88:242-249, 2013.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Kanel, S.R., H. Choi, M.N. Goltz, Transport of surface-modified iron nanoparticle in porous media and application to arsenic remediation, 2013 World Environmental & Water Resources Congress, Cincinnati, OH, 19-23 May 2013.

Kanel, S.R., C. Han, A. Meyerhoefer, G. Crosson, D.D. Dionysiou, A. Agrawal, I. Pavel, P.H. Taylor, R. Striebich, C.A. Impellitteri, M.N. Goltz, Comparison of photo-degradation of 2,4-dinitrotoulene by silver doped and undoped titanium dioxide thin film in the presence of solar and uv light, 245th American Chemical Society National Meeting & Exhibition, New Orleans, LA, 7-11 Apr 2013.

KEEFER, KEVIN J., Research Physicist, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, Atmospheric Physics, United States Air Force Academy, 1981; MS, Systems Management, University of Southern California, 1983; MS Engineering Physics, Air Force Institute of Technology, 1985; PhD, Solid State Physics, Air Force Institute of Technology, 1990; Measurement and Signature Intelligence Certificate, Air Force Institute of Technology, 2004. Dr Keefer's research interests include atmospheric sciences broadly with particular focus on atmospheric radiative transfer for remote sensing and directed energy applications; microphysical and radiative effects associated with atmospheric molecular and aerosol constituents; and military/geo-political history and implications for development of current and future national security strategy. Tel. 937-255-3636 x4344, email: Kevin.Keefer.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

Van Zandt, N.R., S.T. Fiorino, and K.J. Keefer, "Enhanced, Fast-running Scaling Law Model of Thermal Blooming and Turbulence Effects on High Energy Laser Propagation," *Optics Express* Vol. 21, No. 12, pgs 14789 – 14798 (Jun 2013).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Fiorino, S. T., M.F. Via, K.J. Keefer, S.M. Shirey, J.T. Engel, and B.J. Elmore, "Effectiveness of Using Gridded Forecast Data in Hyperspectral Radiative Transfer Analyses and High Energy Laser Mission Planning," 93rd American Meteorological Society Annual Meeting, Austin, TX, 6-10 Jan 2013. <https://ams.confex.com/ams/93Annual/webprogram/Paper221761.html>.

KEENAN, CAMERON B., National Research Council Post-Doctoral Fellow, AFIT Appointment Date: 2011 (AFIT/ENP); BS, Physics, Case Western Reserve University, 2002; PhD, Physics, West Virginia University, 2011. Dr. Keenan's work is focused on radiometric remote sensing and laser material interactions. Tel 937-723-1403. Email: Cameron.Keenan.ctr@afit.edu

KING, AMANDA S., Post-Doctoral Research Associate, Department of Mathematics and Statistics, AFIT Appointment Date: 2013 (AFIT/ENC); BS, Eastern Kentucky University, 2005; MS, Wright State University, 2009; PhD, Air Force Institute of Technology, 2013. Dr. King has been working on a model to predict crack length in air plane wings using electrical impulses. Tel. 937-255-3636 x6105 (DSN 785-3636 x6105), email: Amanda.King@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Schubert Kabban, C. M., A. S. King and M. M. Derriso, "A Notional Framework and Model to Improve Monitoring of Structural Health Systems," *Proceedings of the 9th International Workshop on Structural Health Monitoring (IWSHM)*, 10 pages, Palo Alto, CA, Sep 2013.

OTHER SIGNIFICANT PROFESSIONAL ACTIVITIES

STEM Fellow, Montgomery County School District.

MARKS, JUSTIN D., Post-Doctoral Research Associate, Department of Mathematics and Statistics, AFIT Appointment Date: 2012 (AFIT/ENC); BS, Westmont College, 2006; MS, Colorado State University, 2009; PhD, Colorado State University, 2012. Dr. Marks' research interests include matrix manifolds, image classification, and hyperspectral imaging.

McCRAE, JACK E., Jr., Senior Research Associate, Department of Engineering Physics, AFIT Appointment Date: 2011 (AFIT/ENP); BS, Physics, Massachusetts Institute of Technology, 1984; MS,

Physics (Optics), Air Force Institute of Technology ,1993; PhD, Physics, Air Force Institute of Technology, 1997; Dr McCrae's research interests include optics, lasers, quantum and non-linear optics, quantum computing, laser radar, atmospheric propagation and imaging). Tel. 937-255-3636 x4739 (DSN 785-3636 x4739), email: Jack.McCrae.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

Van Zandt, N.R., S.J. Cusumano, R.J. Bartell, S. Basu, J.E. McCrae, S.T. Fiorino, "Comparison of coherent and incoherent laser beam combination for tactical engagements," *Optical Engineering*, Vol. 51, Article No. 104301/1-19 (2013).

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Basu S., M.W. Hyde, J.E. McCrae, and S.T. Fiorino, "Scattering from a rough surface in presence of atmospheric turbulence," Proceedings of SPIE Defense, Security and Sensing Symposium, Vol. 8732, Paper No. 87320G (2013).

Van Zandt, N.R., J.E. McCrae, and S.T. Fiorino, "PITBUL: a physics-based modeling package for imaging and tracking of airborne targets for HEL applications including active illumination," Proceedings of SPIE Defense, Security and Sensing Symposium, Vol. 8732, Paper No. 87320H (2013).

McCrae, J.E., N.R. Van Zandt, S.J. Cusumano and S.T. Fiorino, "Simulation of atmospheric turbulence compensation through piston only phase control of a laser phased array," Proceedings of SPIE Defense, Security and Sensing Symposium, Vol. 8733, Paper No. 873311 (2013).

MEHMOOD, ASIF, Post-Doctoral Research Associate, Department of Electrical and Computer Engineering, AFIT Appointment Date: July 2012 (AFIT/ENG); B.S., NWFP University of Engineering & Technology, Pakistan, 1992; M.S., Stevens institute of Technology, NJ, 2003; PhD, University of Mississippi, 2008; Postdoctoral fellow at Army Research Laboratory, Adelphi, MD, 2009-2012. Dr. Mehmood research is focused on signal and image processing algorithm development. He is currently working on hyperspectral unmixing and target detection. He has previously worked on anomaly detection in Forward Looking Infrared (FLIR) images, human detection using ultrasound Doppler vibrometry and seismic sensors.

MISAK, HEATH E., Post-Doctoral Research Associate, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2012 (AFIT/ENY); BS, Metallurgical Engineer, University of Missouri Rolla, 2001; MS, Mechanical Engineer, Wichita State University, 2009; PhD, Mechanical Engineer, Wichita State University, 2011. Dr. Misak's work is focused on carbon based nanomaterial research. Tel. 937-255-3636 x4282. email: Heath.Misak@afit.edu

RICE, CHRISTOPHER A., Post-Doctoral Research Associate, Department of Engineering Physics, AFIT Appointment Date: 2012 (AFIT/ENP); BS, Electrical Engineering, Cedarville University, Cedarville Ohio 2004; MS, Electrical Engineering, AFIT, WPAFB, Ohio, 2006; PhD, Applied Physics, AFIT, WPAFB, Ohio, 2012. Dr. Rice is interested in topic areas related to high energy lasers, remote sensing, and optical diagnostics. His work on specific research topics currently include atmospheric propagation of diode pumped alkali lasers; diode pumped alkali laser gain cell construction; modeling, simulation, and validation of directed energy simulations; rare gas laser device construction; and atmospheric aerosol characterization. Tel. 937-255-6565 x4375, email: Christopher.Rice.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

Christopher A. Rice, Kevin C. Gross, and Glen P. Perram. "Investigation of atmospheric O₂ X3Σ⁻g – b1Σ⁺g using open path tunable diode laser absorption spectroscopy," *Applied Physics B: Lasers & Optics*, Vol. 111, pp. 173–182 (2013). <http://dx.doi.org/10.1007/s00340-012-5243-y>; Published online 31-Mar-2013.

Rice, C., Perram, G., Lott, G. "Open-path atmospheric transmission for the diode pumped cesium laser." *Applied Optics*, Vol. 51, pp. 8102-8110 (2012). DOI 10.1364/AO.51.008102.

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF ABSTRACT REVIEW

Rice, C., Perram, G. "Field deployable TDLAS for long path atmospheric transmission," Proc. SPIE 8535, Optics in Atmospheric Propagation and Adaptive Systems XV, 853507 (Nov 1, 2012). DOI: 10.1117/12.972407.

Rice, C., Perram, G. "Effects of atmospheric transmission of high power diode pumped alkali lasers," Proc. SPIE 8610, Free-Space Laser Communication and Atmospheric Propagation XXV, 86100S (Mar 19, 2013). DOI:10.1117/12.981806.

SABELKIN, VOLODYMYR, Post-Doctoral Research Associate, Department of Aeronautics and Astronautics, AFIT Appointment Date: 2012 (AFIT/ENY); PhD, 1980; Dr Sci, 1989, Aircraft Engineering, Kharkov Aviation Institute, Ukraine. Dr. Sabelkin's work is focused on creep, fatigue, crack propagation in metallic alloys and ceramic matrix composite materials under room, sea water and high temperature conditions including harsh space, combustion and localized corrosive environments. Tel. 937-255-3636 ext 7476. email: Volodymyr.Sabelkin@afit.edu

TURNER, DAVID, Post-Doctoral Research Associate, Department of Engineering Physics, AFIT Appointment Date: 2013 (AFIT/ENP); BS, Bio Chemistry, Millersville University of Pennsylvania, 2003; PhD, Chemistry, The Ohio State University, 2009 Dr. Turner's research is focused on advanced spectroscopy of actinides and radiation detection materials. Tel. 937-255-3636 x4742. email: David.Turner.ctr@afit.edu

REFEREED CONFERENCE PAPERS ACCEPTED ON THE BASIS OF FULL PAPER REVIEW

Tony D. Kelly, James Petrosky, John W. McClory, Timothy Zens, David Turner, James Mann, Joseph Kolis, Juan A. Colón Santana, and Peter A. Dowben, "The Debye Temperature for Hydrothermally Grown ThO₂ Single Crystals," *2013 Material Research Society Spring Meeting*, Paper No. WW10.03, San Francisco CA, 4 Apr 2013.

XING, YUN, Post-Doctoral Research Associate, Department of Engineering Physics, AFIT Appointment Date: 2011 (AFIT/ENP); BS, Biochemical Engineering, Tianjin University, China, 1998; PhD, Bioengineering, Georgia Institute of Technology, 2005. From 2006 to 2008 she worked as a postdoctoral fellow in the Molecular Imaging program at Stanford (MIPS). She has over 10 years of research experience in the areas of bioengineering, biomedical imaging, nanotechnologies and biological sensing. She has published over 18 peer-reviewed journal papers and 5 invited book chapters in the areas of cell culture, DNA and protein analysis (PCR, gel electrophoresis, western blotting, etc.), fluorescence labeling, various types of microscopy (epifluorescence, con-focal, multi-spectral imaging, SEM, TEM, AFM) as well as nanoparticle functionalization and characterization. Tel. 937-255-2012 x4241, email: Yun.Xing.ctr@afit.edu

REFEREED JOURNAL PUBLICATIONS

Alex G. Li, Yun Xing, and Larry W. Burggraf, "Thermal Effects on Surface Structures and Properties of Bacillus Anthracis Spores on Nanometer Scales," *Langmuir*, Vol. 29, pp. 8343-8354 (2013).

APPENDIX B: SELECTED ACRONYM LIST

There are a number of abbreviations for organizations that are used in this report. This alphabetical listing includes only selected organizations.

711 HPW/RH	711 th Human Performance Wing Human Effectiveness Directorate
ACC	Air Combat Command
AETC	Air Education and Training Command
AFCEC	Air Force Civil Engineering Center
AFIT	Air Force Institute of Technology
AFLCMC	Air Force Life Cycle Management Center
AFMA	Air Force Manpower Agency
AFMC	Air Force Materiel Command
AFMLO	Air Force Medical Logistics Office
AFMSA	Air Force Medical Support Agency
AFNWC	Air Force Nuclear Weapons Center
AFPC	Air Force Personnel Center
AFRL	Air Force Research Laboratory
AFRL/AFOSR	AFRL/Air Force Office of Scientific Research
AFRL/RD	AFRL/Directed Energy Directorate
AFRL/RI	AFRL/Information Directorate
AFRL/RQ	AFRL/Aerospace Systems Directorate
AFRL/RV	AFRL/Space Vehicles Directorate
AFRL/RW	AFRL/Munitions Directorate
AFRL/RX	AFRL/Materials and Manufacturing Directorate
AFRL/RY	AFRL/Sensors Directorate
AFSC	Air Force Sustainment Center
AFSEO	Air Force Seek Eagle Office (46 SK/SKE)
AFSPC	Air Force Space Command
AFTPS	Air Force Test Pilot School
AFTAC	Air Force Technical Applications Center
AFW2	Air Force Wounded Warrior Program
AFWA	Air Force Weather Agency
AIAA	American Institute of Aeronautics and Astronautics
AMC	Air Mobility Command
AMRDEC	Aviation and Missile Research Development and Engineering Center
AS&T	Advanced Systems and Technology
ASC	Aeronautical Systems Center
ASEE	American Society for Engineering Education
ASME	American Society of Mechanical Engineers
CAA	Center for Army Analysis
DAGSI	Dayton Area Graduate Studies Institute
DARPA	Defense Advanced Research Projects Agency
DHS	Department of Homeland Security
DIA	Defense Intelligence Agency
DOD	Department of Defense
DOE	Department of Energy
DTRA	Defense Threat Reduction Agency
EPA	Environment Protection Agency
ERDC	Engineer Research and Development Center
EUCOM	United States European Command
HELJTO	High Energy Laser Joint Technology Office
IEEE	Institute of Electrical and Electronics Engineers
INCOSE	International Council on Systems Engineering

JASPO	Joint Aircraft Survivability Program Office
JWAC	Joint Warfare Analysis Center
LTS	Laboratory for Telecommunications Sciences
MIT	Massachusetts Institute of Technology
MORS	Military Operations Research Society
NASA	National Aeronautics and Space Administration
NASIC	National Air and Space Intelligence Center
NGA	National Geospatial-Intelligence Agency
NHSRC	National Homeland Security Research Center
NNSA	National Nuclear Security Administration
NPS	Naval Postgraduate School
NRL	Naval Research Lab
NRO	National Reconnaissance Office
NSA	National Security Agency
NSF	National Science Foundation
ORSO	Operationally Responsive Space Office
OSD	Office of the Secretary of Defense
SAF	Office of the Secretary of the Air Force
SMC	Space and Missiles Systems Center
SPIE	The International Society for Optical Engineering
USAF	United States Air Force
USAFA	United States Air Force Academy
USSOCOM	United States Special Operations Command
USSTRATCOM	United States Strategic Command
USTRANSCOM	United States Transportation Command
WPAFB	Wright-Patterson Air Force Base

APPENDIX C: INFORMATION FOR OBTAINING A COPY OF A THESIS

Copies of theses with unlimited distribution may be obtained from the following agencies depending on the particular circumstances.

U.S. Government employees, individuals affiliated with a research and development activity within the U.S. Government, or its associated contractors, subcontractors, or grantees, under current U.S. Government contract; can order from:

DEFENSE TECHNICAL INFORMATION CENTER
8725 John J. Kingman Road, STE 0944
Ft Belvoir, VA 22060-6218
Phone: 1-800-225-3842
Website: <http://www.dtic.mil/>

Private U. S. citizens without a U. S. Government contract can order from:

NATIONAL TECHNICAL INFORMATION SERVICE
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161
Phone: 1-800-553-6847
Website: <http://www.ntis.gov>

Information needed to obtain a given document:

1) author, 2) title, 3) publication date, and 4) reference to the document as an Air Force Institute of Technology thesis.

General inquiries concerning faculty and student research at the Air Force Institute of Technology may be addressed to:

Office of Research and Sponsored Programs (AFIT/ENR)
Air Force Institute of Technology
2950 Hobson Way
Wright-Patterson AFB, OH 45433-7765
Phone: 937-255-3633 (DSN 785-3633)
Website: <http://www.afit.edu>
Email: research@afit.edu

REPORT DOCUMENTATION PAGE				Form Approved OMB No. 074-0188	
<p>The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.</p> <p>PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.</p>					
1. REPORT DATE (DD-MM-YYYY) 31 Jan 2014		2. REPORT TYPE Annual Report		3. DATES COVERED (From – To) 01 Oct 12 – 30 Sep 13	
4. TITLE AND SUBTITLE AIR FORCE INSTITUTE OF TECHNOLOGY RESEARCH REPORT 2013				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Office of Research and Sponsored Programs, Graduate School of Engineering and Management				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(S) Air Force Institute of Technology Graduate School of Engineering and Management (AFIT/EN) 2950 Hobson Way WPAFB OH 45433-7765				8. PERFORMING ORGANIZATION REPORT NUMBER AFIT/EN/TR-14-01	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) Air Force Institute of Technology Graduate School of Engineering and Management (AFIT/EN) 2950 Hobson Way WPAFB OH 45433-7765				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT <p>This report summarizes the research activities of the Air Force Institute of Technology's Graduate School of Engineering and Management. It describes research interests and faculty expertise; lists student theses/dissertations; identifies research sponsors and contributions; and outlines the procedures for contacting the school. Included in the report are: faculty publications, conference presentations, consultations, and funded research projects. Research was conducted in the areas of Aeronautical and Astronautical Engineering, Electrical Engineering and Electro-Optics, Computer Engineering and Computer Science, Systems Engineering and Management, Operational Sciences, Mathematics, Statistics and Engineering Physics.</p>					
15. SUBJECT TERMS Air Force Institute of Technology, Research Report 2013					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
REPORT U	ABSTRACT U	c. THIS PAGE U			Dr. Michael J. Caylor
				235	19b. TELEPHONE NUMBER (Include area code) 937-255-3633, research@afit.edu

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39-18